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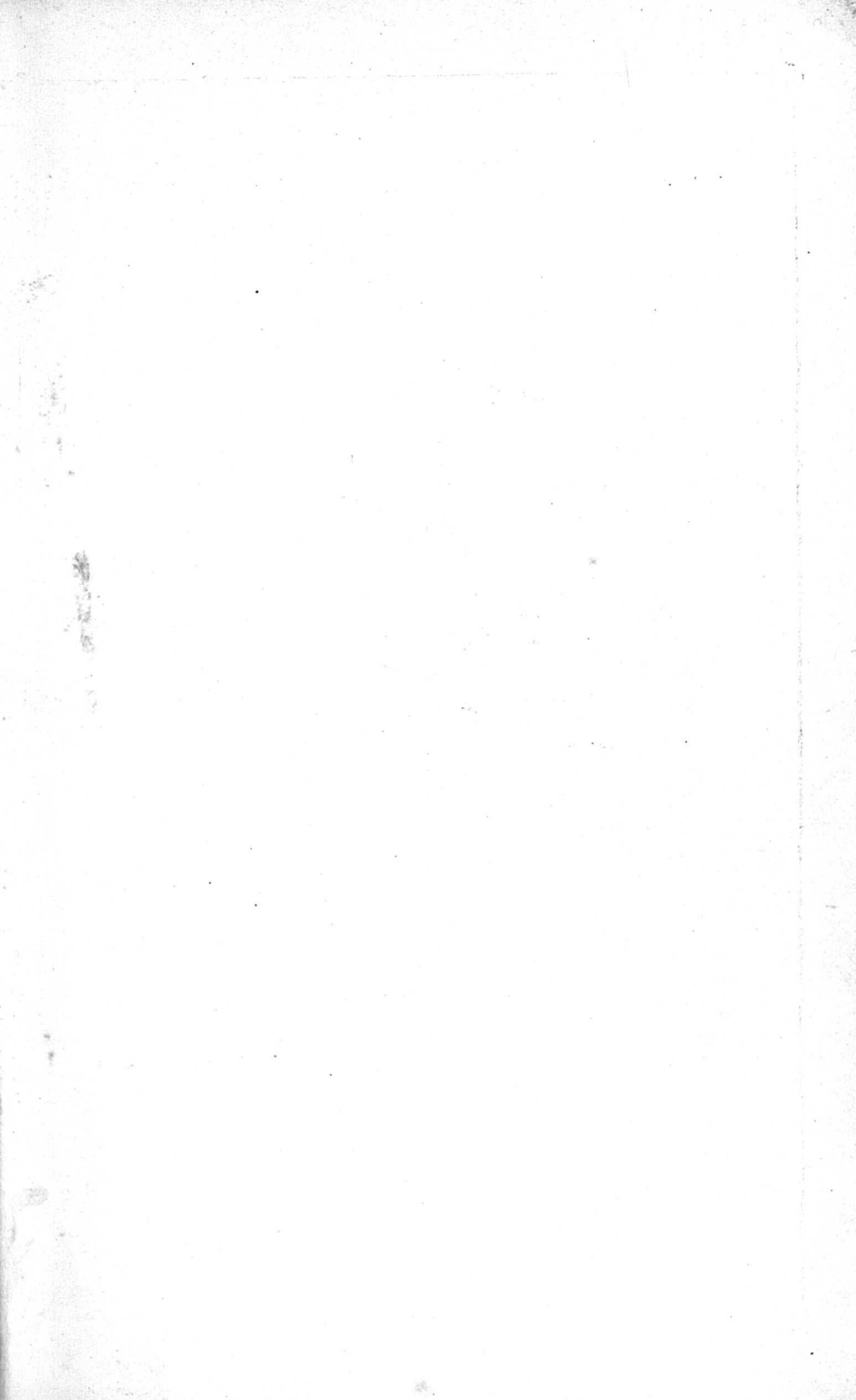
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ALPINE VILLAGE.

THE ALPS

OR

SKETCHES

OF

LIFE AND NATURE IN THE MOUNTAINS

BY

H. BERLEPSCH

TRANSLATED BY

THE REV. LESLIE STEPHEN, M.A.

Fellow and Tutor of Trinity Hall, Cambridge

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With 17 Plates from Designs by Emil Rittmeyer

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NOTE BY THE TRANSLATOR

ON

THE EXPLORATIONS OF 1861

Jacomb crossed the range of the Monte Rosa between the Twins and the Lyskamm. Other new passes were effected by Mr. S. Winkworth over the Argentière and Neewaz glaciers, and by Sir F. and Mr. E. Buxton and Mr. Cowell over the Chermontane and Otemma glaciers from the Val de Bagne into the Eringer Thal.

An ascent of the Bernina (the first by an Englishman, though not the first on record) was made by Mr. Hardy and Mr. Kennedy, and the route from St. Gervais to Mont Blanc by the Aiguille and Dôme de Gouté and the Bosse was for the first time actually made (by Mr. Tuckett and the Translator), although Mr. Hudson had previously fully shown its practicability and in fact made the whole route at different times.

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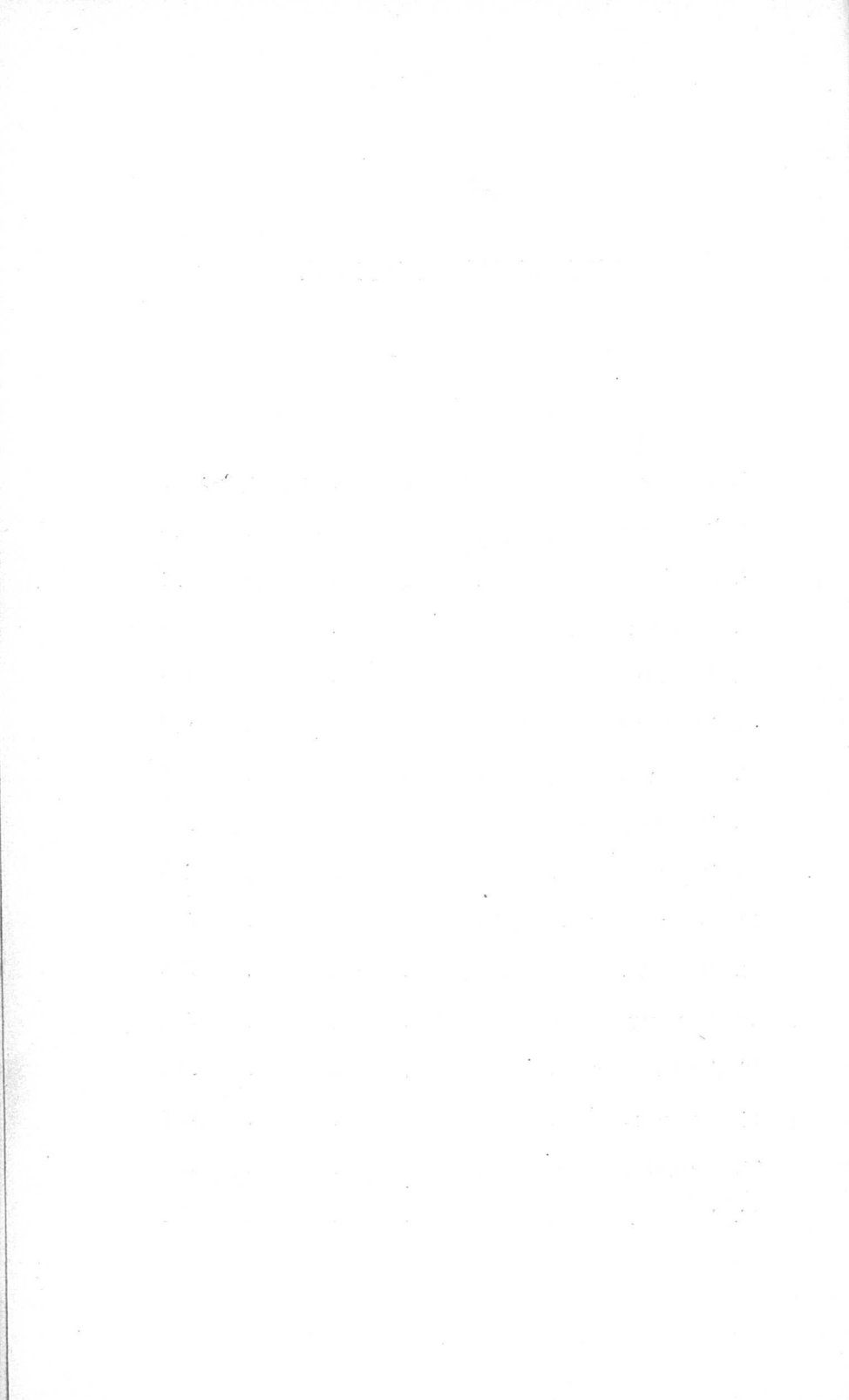
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THE ALPS.

CHAPTER I.

THE FABRIC OF THE ALPS.

THE Alps are amongst the sublimest proofs of the majesty of the creative power.

A thinking man must have already been astonished at the wonderful manifestations of the powers of production, preservation, and dissolution in nature. Daily and hourly before his eyes, she is forming what is new by her universal laws of organisation, imparting life and motion to that which already exists, and using up what has done its work as the source of new materials or new modifications in the vast cycle of creation, and thus giving him some measure of the never-resting, all-grasping, all-embracing activity of the great Spirit which penetrates the universe. Still he will stand in astonishment before that giant edifice of the Alps, built up by powers, whose origin and action can indeed be described, and whose relation to other powers can be set forth according to the laws which the natural sciences have won from phenomena, but whose whole extension and boundaries in the universe human knowledge can only dimly suspect.

There are but few men who know the real and full majesty of the fabric of the Alps. It unveils itself least

of all where the broad military roads stretch over passes and mountain "saddles," or where the trivial employments of daily life are swarming round the footstools of this wonder of creation. You must penetrate into the secrets of the hidden world of mountains, into the solitude of the closed gorges and valleys, where man's power of cultivation sinks powerless as he comprehends the weakness of his efforts against the majesty of Nature in the Alps. You must climb above the ruins of a primeval world, and press through labyrinths of glacier and wastes of ice into the temple sanctuary where it strikes up freely and boldly into the sky before your wearied eyes. Then you will encounter the indescribable splendour of the Alpine world in all its vastness, till you are ready to sink under the thought of its awfulness; and when you have recovered from your first impression,—when, in sight of the gigantic masses, you have opened your heart and prepared it to receive still nobler revelations,—then question boldly those mausoleums of immemorial time: ask them what hand raised them from the depths of eternal darkness into the kingdom of light; consult the rocky leaves of this stone chronicle for the history of their creation and the end of their existence. The vast dead masses will become alive for you, and a view will open for you into the endless cycle of eternity.

The Alps stretch in a vast semicircle through Southern Europe, a limb of that colossal skeleton of the earth which, under the name of the Pyrenees, Apennine, Tschardagh, and Hæmus, gives internal support to the Spanish, Italian, and Grecian peninsulas, as they stretch out into the Mediterranean Sea. They are the results of the crystallisations and deposits of many hundreds of thousands of years in primeval oceans. Then, in different epochs, followed elevations and depressions, repeated floods and new deposits, till at last the fiery products of the great

melting furnaces of the earth's interior burst through these manifold superimposed layers.

Who could have witnessed those convulsions and outbursts, when in the central Alps, the very inmost kernel of the gigantic mountain fabric, the granite, gneiss, and crystalline schists were forced up from the depths of the earth's crust, pierced by the sharp masses of the hornblende rocks, and spread out like a fan? How powerless would be the wildest natural convulsions that we know,—how insignificant the earthquakes, storms, volcanoes, and landslips of the present time, by the side of that catastrophe, when the Alps took their present shape! Our understanding has absolutely no standing-point from whence to form a conception even faintly answering to those moments when a world was shattered. If we multiplied a thousandfold the most frightful uproar of the wildest thunderstorm that our fancy can paint,—if we could think of all the artillery which has ever been available for human warfare, as gathered into one place and discharged at a single command, the disturbance would be as nothing by the side of that moment when millions upon millions of cubic fathoms of the solid rock of the central Alps were torn up crushed from their bed, and sent up as high as heaven, or pitched over and over into heaps.

It is highly probable in itself that most of the processes which formed the earth were developed with exceeding slowness. It may be granted indeed that during the great periods of revolution the rock formations were far less hard and consolidated than now; so that the two factors which always go furthest to determine the shape of the earth, the centrifugal or mechanical force of the earth's rotation, and the expansive force of gases or the pressure of water from within, might have operated more steadily

and effectively than now. But it is just as certain that other physical laws, to which matter must always have been subject, — the laws of gravity for example, — must have induced moments in the history of the external formation of the Alps, which belong to the most fearful that the human mind can conceive. A thousand marks show this on a nearer observation of the mountain forms, such as the picturesque, sharp-cornered lines and clefts of the dolomite mountains, which neither get rounded off nor break away in splinters — the strange zigzag ornaments and marvellous fantastic forms in the limestone Alps, when not concealed by masses of snow, or by more modern overlying rocks. The same truth is proved by the deep gorges and rents of the valleys, such as those in the Via Mala, the valley of Tamina, the defile of Trient, the gorge-shaped openings of most of the southern lateral valleys in the Valais and Engadine, both of which show in their rock-walls the traces (even to the minutest details) of the broken surfaces passing over each other. It is proved again by those vertical walls of rock in which all the successive layers are shown in a transverse section, whilst the massive counterpart in which they were once continued has sunk into the abyss, *e. g.* the walls of the Churfirst chain on the Wallensee, the rocky front of the Frohn Alp Stock on the Lake of Lucerne, &c.

If we go on to consider those majestically aspiring masses which rise free and bold into the clouds like gigantic obelisk spikes, — as the bare and inaccessible Matterhorn (14,705 feet in height*), the dazzling snow pyramid of the Dent Blanche (14,322 feet), or the nine-pointed diadem of the Monte Rosa (15,217 feet), which never can have been protruded through the earth's crust in their present shape, and can be nothing but isolated ruins

* The heights are given throughout this work in English feet.

of the primeval mountain fabric,—what fearful ages of destruction must there have been, to allow the intervening masses, now vanished, to be torn away, and to sink, probably, into the depths whence they rose? For a number of proofs show that no influence of weather on these towers of rock can ever have so modelled and gnawed them down.

In no other mountains of Europe are proofs of elevation, levelling, and reconstruction to be seen so close and in so marked a degree as in the Alps. In sublimity of form, and variety of the cleavage and splintering of their beds, they are excelled by none of our continent.

Moreover, no other mountains of this quarter of the globe can show such richness in minerals, or such an instructive scale of the processes of formation. Indeed, the geologist may find perfectly insoluble riddles in the inversions or perfectly abnormal interchange of strata, in the insertion of sedimentary beds amongst the crystalline rocks, and in opposing stratifications, which open the door to the most hazardous conjectures.

To form an approximately right idea of the internal construction of the materials, and of the series of formations in the Alps, let us suppose that a primeval sea, during long periods of creation, deposited layers of mud, such as we may still see on a small scale on the banks of rivers after floods. Each of these periods engulfed wholly or in part the plants and animals which had been developed on the then existing islands or continents, and buried them in the beds deposited. Whole generations of organisms, which no longer exist in our time, perished with them. These enclosed witnesses of the different epochs of organic life (still found as fossils or impressions of plants in the mountain beds) became the marks by which the science of geology arranges its history of creation. Their sequence, where it has not been dis-

turbed by force, is the same over the whole surface of the earth. Thus the oldest sedimentary deposits must be the lowest, and those which followed later must be above them. Thus it is also throughout the Alpine land.

A journey south from Germany brings us through the geological formations of all the chief epochs, and is well calculated to show their principal elements and mutual connection.

The great cultivated Bavarian plains between the Danube and the Inn, the levels of Nuremburg, Ulm, Augsburg, Munich, up to the neighbourhood of Passau, belong to the most modern deposits, or alluvial formations. Wherever a spade is struck into the earth through the upper soil, we come upon gravel and deposits of mud or peat. Below these the diluvial formations appear in stratified or unstratified beds, hence called erratic strata. Stone quarries are so rare that in the villages in many parts, wooden boundary-stones are used. A step further south brings us to the mountainous plateau, to the Bavarian highlands, to the Allgau, to the Lake of Constance, and into the broadest and largest valley of Europe, to the Swiss "Middle-Land" (between the Jura and the Alps) where are placed Zurich, Berne, Freiburg, and Lausanne. Meadow and forest alternate with agricultural districts; the landscape takes more distinct colours and shapes; the rivers and streams hurry at a swifter pace, and collect into deep lake-basins at the foot of the outlying mountains. Gently swelling forms of leaf foliage * still crown the heights and valleys. Far away the hill-sides are still marked with scattered houses. Villages and towns still swarm with a quickly-beating, struggling, trade-loving life. It is the "molasse" formation, which shows itself by the shells enclosed in it to be partly a saltwater and partly a freshwater deposit, and

* Opposed to the "needle" foliage of the pine forest.

consists principally of blue sandstones, beds of marl and clay, freshwater limestone, muschel-sandstein, and great banks of conglomerate called "nagelfluh." The mountains of this region are in rounded hill-like forms; in Switzerland they rise in rather more decided lines to a height of 6500 feet. Taking another step towards the mountains, we reach Salzburg, Sonthofen, the Austrian Vorarlberg, the cantons of Appenzell, St. Gallen, Glarus, Schwyz, up to Sarnen in Unterwalden, and the beautiful Lake of Thun. Agriculture disappears more and more, the landscape becomes more Alpine, the leafy forest retires, and the "needle-wood" (pine) forest appears in its stead; the people are principally engaged in tending cattle. The dazzling colours of the red-tiled roofs and whitewashed houses disappear. Silver-grey upon green, the pale shingle roofs on wooden houses in the midst of swelling meadows, are now the characteristic features. The "molasse" disappears; another formation rises to the surface which is older, and extends through the whole of Southern Europe, far away towards Africa and Asia.

It is the eocene formation, which, under the division of flysch and nummulite, occurs sometimes as slate and sandstone, sometimes as limestone, in respectable mountain-chains and steep façades of rock. It is to be understood that the whole mass of the mountain does not consist of this formation, but that it constitutes either the principal mass—as in the noble pyramid of the Niesen (7790 feet) near Thun, where the beds of flysch attain a thickness of near 5000 feet—or the uppermost portion where its rocks are raised to a giddy height, as in the Schratzenfluh in the Emmenthal, or in the splintered Ralligstock (which has visibly been depressed into itself), or in the Niederhorn in the Justithal on the Lake of Thun, where nummulitic limestone forms the highest crests. The well-known

Faulhorn also, the object of the summer excursions of tourists, consists of rough red slates of the flysch period, whose decaying ("verfaulende") stone has caused the mountain's name. Still further up, to heights of 10,000 or 11,000 feet, flysch or nummulite sand has been raised to the highest summits of the Clariden and Tödi. There it covers, as though with a housewife's cap, the very top of the aged mountain, the mass of whose mighty body is formed of crystalline rocks (gneiss).

But acquaintance may be formed with these rocks without ascending such heights. They are found in the valleys also. The black, ever-moist walls of rock of the Tamina gorge in which lies the source of the medicinal springs of Pfäfers, the crumbling rocks around the baths of Fidis in the Prätigau, the immediate neighbourhood of the baths of Stachelberg in the valley of Glarus, are all flysch. We stand here at the limit of one of the great epochs of the creation of the earth; for with the eocene period is concluded the great series of the tertiary formations. All below them,—all mountains which rise towards the Alps before us are older, and belong to earlier times. They are classed as the secondary formations. The whole region in which these rocks appear must have already existed as firm land when the molasse was deposited, and have risen above the primeval ocean. This continent was far greater than now appears. The great group of the chalk formations which rests below it has in many places broken through and cast aside its covering of flysch. This appears most strikingly in the Vorarlberg Alps, especially in the chain of Säntis and the Churfirst mountains, and again in the Alps of Schwyz, where, for example, the Mythenstock strikes up like teeth through flesh, in the Nidwalden Alps, in the jagged Pilatus, in the Schaafmatt, the Scheibengütsch, the Brienzer

Rothhorn, and many other mountains of the Bernese Oberland. By the designation "chalk formations" we must not understand white writing chalk; it includes all rocks which contain the same fossils and organic remains as the chalk, and therefore belong to the same periods of deposition. It is an exceedingly extensive formation, and, for example, covers in North America an area of 120 by 300 miles (geographical).

The cliffs and crests of this formation rise more roughly and boldly, and with more strongly marked outlines, than those of the flysch. They often form picturesquely pointed rock-façades, with surprisingly beautiful details. All the sublime decorations of the shores of the Wallensee, the Lakes of Lucerne and Brienz, with their pillar-arcades and buttresses, their niches and angle-columns, whose grouping and arrangement is so marvellously beautiful, belong to the chalk formation. There we see already grand Alpine forms in grotesque masses, like outposts of the imposing army of summits, which has placed its camp behind them. The chalk rocks seldom attain a height above the snow boundary, *i.e.* of more than 7000 or 8000 feet. In this formation science again distinguishes four different kinds of rock. The lowest is that of the "Spatangkalk" or Neocomian chalk, so called from Neocomum or Neuchâtel, in which neighbourhood it is best developed. Upon it lies the Caprotino-kalk, of which more will be said in the description of the "Karren" fields. Above this again is the gault, a sandstone very rich in fossils, and, finally, above this the most modern deposit of the "Seewerkalk."

In a great district of the Bernese Alps, that, namely, between the Rhone and Aar, the cretaceous formations disappear, and a more ancient one, the Jura chalk, with many fossils, takes their place. Here we enter the high Alps. We stand upon the lowest step in the ascending

staircase of the great Alpine valleys. Through every gap of the lofty masses the fields of névé and snow-covered summits shine down. From them the waterfalls, scattered into foam-flakes, roar over the steep walls of rock, which sometimes, like the Giessbach and Reichenbach, dash down to the valley like broad full sheaves of water, or, spreading out into sparkling dust, stream down in waving veils like the Oltschibach, Staubbach, and the others at the head of the Valley of Lauterbrunnen. The population no longer lives in rich groups of villages spread far and wide over mountain-slopes and heights. It has taken refuge lower down in the valley, where the narrow path allows of communication, and the dwellings are sheltered from the climate; only during the summer the inhabitants lead a nomadic life with their cattle in the high pasturages. The powers that raise mountains and shape Alps have here worked energetically. It becomes evident that we are approaching the central craters of elevation. Like the ring of mountains with a steep inclination inwards which runs round the hearth of a volcano, one, two, or even three limestone chains turn their steep and lofty rock-walls, which sometimes rise above the snow, towards the granitic mountains. The stratification of the limestone Alps is always inclined outwards, a proof that at the formation of the Alps these upper strata were burst by the granite masses rising from the depths of the earth, and lifted into an oblique position.

As the high Alps did not yet exist in their present wild bold forms, when the limestone rocks formed only flat scattered islands rising from the ancient sea, a gigantic vegetation must then have flourished on them, and grisly monsters swarmed in the deep.

It is the former home of the ichthyosaurs and plesiosaurs, those mongrel monsters, fifty feet in length, half

crocodile, half fish. It is the place where the gigantic petrifications known as Ammonites and Nautili are found. Many of the limestone summits reach far above the snow line, *e. g.* the Oldenhorn (10,290 feet), the Weiss-horn (10,921 feet), the Urirothstock (9758 feet), the Altels (11,960 feet), the Windgelle (10,505 feet), and the Scherhorn (10,857 feet).

In the Eastern Alps, where the table-land formation is more common in the configuration of the mountains, the still older trias-dolomite and keuper, and the rocks of the lias, occupy the place of the Jura limestone.

We have reached the boundary line of the Neptunian deposits. We come to the region of the deposits which probably belong to the oldest of the earth's crust, the slaty Alps, which clothe the granitic kernel that has risen from the earth's interior, or even passes into it. There the Alpine traveller who comes from the north is astonished by a striking phenomenon. Till this point, he assumed that all the rock-strata, whose profile he could often plainly observe in the valley walls, incline gently towards the low country — unmistakably so, as though they had been raised by the Alps and brought into this oblique position. Now all at once the opposite phenomenon occurs. Amongst the monstrous limestone rocks, whose strata rise often to the clouds with a northern or north-westerly dip, suddenly there rise up buttresses which appear to prop these up at right angles. We see this when we enter the valley of the Rhone from the Lake of Geneva, in the angular limestone mass of the Dent du Midi at Evionaz, or when we are ascending from smiling Brienz through the Hasle-thal to the Grimsel behind the angle of the "Kirchet," in the picturesque valley-bottom "Im Grund," where the Urbach and Mühlethal open; or still more in the St. Gothard Pass, behind

Altdorf at the "Klus," and further up towards Amsteg, where the limestone strata with their northerly dip lie upon masses of gneiss sinking steeply towards the south. Here also we find the first traces of that tremendous lever which directly or indirectly elevated the whole grand Alpine fabric. The covering of slate has through enormous districts been burst, torn, overthrown, elevated, doubled up, or resolved into its elements by the action of heat. Only in Savoy in part of the valley of the Arve, in Piedmont, in the valleys of the Upper Isere and the Dora-Baltea, in the Southern Valais, in many parts of the Grisons, especially too in the Lower Engadine, the masses known as grey, green, and belemnite slates have kept their continuity, and form gigantic mountain chains. But where the central crystalline masses have broken through, as granite, protogine, gneiss, and mica-schists, and thrown on one side all the former strata, there they stand in vertical positions like the limbs of colossal fans.

These form the far-seen heads of the still, lofty Alpine kingdom, which look in solemn majesty over the whole of central Europe, from whose giant shoulders their royal mantles sparkling with snow stream down in glacier-trains. These form the mighty head of the eternal Mont Blanc (15,836 feet); of the Monte Rosa, with her nine-pointed crown; of the still inaccessible mountain-pyramid of the Matterhorn (14,705 feet); of the wild Mischabelhörner; of the Weisshorn, rising in its incomparable splendour 14,804 feet; of the bold rock-lance of the Finster Aarhorn (14,081 feet); of the steep Wetterhörner (12,162 feet); of the solitary Adula or Vogelberg (11,185 feet); of the glacier-clothed Piz Bernina (13,297 feet); of the Silvretta (11,252 feet); the Ortler-spitz (12,960 feet); and the Gross-Glockner (12,956 feet).

"All magnitudes, as conceived by mere imagination,

must be small by the side of the Alps," says Bonstetten, and in fact there can scarcely be on the continent of Europe a more startling and overwhelming sight than that from one of the well-known points in the Bernese chain (*e. g.* the height of the Gemmi, the Torenthorn at Leuk, or the Wildhorn, by the Rawyl pass) across to the southern Alps of the Valais. It is a panorama of almost indescribable sublimity, of almost terrifying splendour. The great rent lateral valleys of the Valais look so terribly serious and threatening,—they rise like dim traditional forms, coloured by pine forests to half their height with hues so mysteriously blended,—they contrast so awfully with the dazzling snow lines above, that many a determined mountaineer might fear to tread them. And yet in their depths the most beautiful of natural scenery lies hidden. The background of the Zermatt valley and of the Einfischthal is excelled in majesty by none in the Alps, not even by the celebrated Chamouni.

The granitic masses have again been so terribly split and transformed by later catastrophes and changed in their whole configuration, that only the sagacity of a geologist can guess at their former probable connection. Innumerable chemical metamorphoses of particular parts, especially in the slaty mountains, have taken place. The action of heat, steam, the penetration of gases and acids, decay and new formation by combinations, have changed square miles of the Alps into new kinds of rocks: to these, for example, the verrucano formations belong. Huge veins of gypsum as later chemical combinations traverse the crystalline masses; hornblende rocks rise in eruptive dikes like columns rising from the world below, in the innermost kernel of the central masses, coming to light at their highest points. This laboratory inside the earth, ever-

lastingly dissolving, and preparing new processes, whose safety-valves are, according to Humboldt, the volcanoes, is still working below the mass of the Alps. The many jets of carbonic acid gas, the many mineral springs, which, exhaling suffocating and poisonous vapours, form dangerous "mofetten" in the Engadine, are proofs of it.

Throughout the whole Alpine wall, running from south-west to north-east, there is nowhere to be found the exact series of formations, proceeding regularly from the most modern to the most ancient, which we have described. It is frequently interrupted or completely inverted. This is the case in the mountain cauldron, now intersected by the railway, between Glärnisch, the Churfirst chain, and Kalanda. There the older strata are placed upon the more recent, so that here one of the greatest convulsions must have occurred. Around the mountains mentioned, the broken-off heads of strata confirm the occurrence of an extensive catastrophe. The masses of verrucano here appear as a beautiful red conglomerate close by the railway.

Seen from the south the form of the Alps is quite different. The inclinations are much steeper and less interrupted than on the north. The mountains are free from snow to a much greater height, owing to their southern aspect and their greater isolation, showing merely the naked skeleton of rock. The varied middle ground is wanting, as are also the brightly-coloured "Vorberge." Above, the lines and colouring are more monotonous. The geological change of strata, and the variety and picturesque motion resulting from it, are wanting. Along the limestone Alps from the Jura even to Hungary is a girdle of blue smiling lakes, while on the southern side there are only a few crowded together in the region of the "See-Alpen." The Graian, Cottian, and maritime Alps in the west, and the Tyrolese, Carinthian, and Noric Alps in the east, are entirely

without this beautiful ornament except a few very small basins of water. The cause of this remarkable difference lies in the soil. The latest alluvial deposits of Sardinia and Lombardy border immediately upon the crystalline and slate formations of the western Alps.

The raising of the Alpine fabric, and of the Jura which was raised by means of it, was a necessity for the civilisation of Europe. Without those mountains the meteorological conditions of our quarter of the earth, and all other circumstances depending on them, would now be different. Without the Alps, destroying blasts of hot winds would have swept over Germany and Holland from the African deserts. The "Föhn," a continuation of the southern sirocco, which rages fearfully in the high Alpine valleys, would rush in, unstopped, unbroken, and with unslackened speed, over Germany, and reduce agriculture to very different conditions. On the other hand the southern vegetation which covers the rich plain of the Po under the influence of gentle breezes, would be rendered impossible by the winter north storm now held back by the Alps. The mutual action of climates by the relation of their temperatures would be quite altered.

The activity again of the cloud formations, and with them the sum of the atmospheric precipitations, would be simultaneously changed. The Alpine region, in which the greatest proportion of rain and snow in all Europe falls annually, is the inexhaustible supplier of water to the Rhine, Danube, Rhone, and Po. Without the rich magazine of snow on the heights, these streams with their thousand branching systems of springs would become unimportant watercourses. All those natural roads which the rivers were forming for thousands of years before the railway crossed them, would have been of no historical importance for business and commerce.

The Alpine fabric includes an inexhaustible wealth of natural wonders. No other mountain-chain of Europe includes, like the Alps, the flora of three zones. The arctic and the temperate join hands with the tropical, and we find representatives of the vegetation of more than thirty degrees of latitude in a short space. In no other mountains of our quarter of the earth does the power of the atmosphere act with such fearful force and such tremendous manifestations of strength, and in none are the contrasts in the life of their inhabitants so striking as in the Alps. The object of the following pages is to give detached pictures of these various points of interest.

12

CHAP. II.

GRANITE.

GRANITE is a symbolic substance—it, in common with marble, is the historic stone. As amongst beasts the lion ranks as king, being the representative of noble qualities and physical power,—as amongst plants the oak presents a picture of firmness and endurance, of proud contempt of storm and weather,—so granite represents all that is unconquerable and unchangeable in the kingdom of dead inorganic matter: it is, in the narrow material sense, a substance of eternal duration. Where monuments were to be erected for the most distant human races, visible pillars for the annals of history,—where Egyptian dynasties raised the colossal tombs of their kings in those pyramids which are still wondered at, on the borders of the desert, as the mightiest works of human power,—there the bold architect grasped the granite rock and thought that he had saved a scrap from the destruction that awaits everything wrought by human hands. The earlier inquirers into natural science constructed our earth's kernel of granite, and saw in it the grandfather of the whole mineral kingdom, and naïvely called it the “Urgestein,” the primeval stone. And yet it only marks one punctuation in the history of the world's creation, an unimportant second in the cipher of eternity, a thing of the past, which will dissolve as it has arisen.

In the language of enthusiastic Alpine tourists, granite is a highly comprehensive word, a *nomen collectivum* unconsciously used, embracing everything which seems as if it ought to belong to the noble stone of monuments and triumphal arches. There are many intelligent people who, when they see black and white spotted rocks in the Alps, set them down roundly as granite, and yet but little in proportion of granite properly so called occurs in the Alps; but, it is true, a great deal of granitic rock. Let us therefore see a little more clearly what granite (from *granum*) is, and learn to know a little more accurately its nature and composition. Granite and gneiss are fundamentally of the same composition,—a rock formed of three minerals, felspar, quartz, and mica. If it is granular and massive, it is called granite; if a certain stratification may be distinguished in it, it is gneiss. Granite is not a conglomerate, not the product of originally different minerals combined by mechanical means. It is an original formation, which eliminated from each other, by crystallisation, the various kinds of minerals brought together in a fluid state. An example, not quite to the point, but still illustrative, may be brought from chemistry. Every one can try this little experiment:—common salt and saltpetre dissolved in water to saturation, so that both salts appear to be thoroughly mixed, crystallise as the fluid is evaporated, each again separating independently: the common salt in rectangular cubes, the saltpetre in long hexagonal columns, so that each of the salts shows again the same peculiar properties.

Felspar, generally milkwhite or grey, and also reddish, forms the principal mass, nearly half of the true granite, between which white (or more rarely yellow or greenish) crystalline, glassy, transparent grains of quartz are intermixed, and in which thin bright mica flakes are imbedded.

This normal composition, however, changes much in different places. Any one who visits the baths at St. Moriz in the Upper Engadine, may in every walk collect several varieties; for the Bernina granite is green, including serpentine, whilst that from the opposite Piz Languard contains red felspar with milkwhite quartz. Still more striking is the variety of the granites in the Lago Maggiore. That of Baveno, opposite the Borromean islands, is of a beautiful peach colour, whilst the celebrated "miarolo bianco," from the quarries of the neighbouring Monte Orfano, is white, and in appearance quite a different stone. This last-mentioned granite was the material of many of the North Italian churches; for example, the noble pillars at the entrance of Milan Cathedral are worked out of this rock. If the characteristic shining mica is wanting in the mass, and it is penetrated by black or dark green hornblende, it loses the name of granite, and is called syenite. This variety is spread over all parts of the world, and received its name from the town Syene in Upper Egypt (where it occurs in large quantities), and is much valued for its endurance as an excellent and easily polished building material. The pyramids and obelisks are chiefly of syenite. In our Alps it abounds on the south side, as in the Val Peltine (to which the Col de Collon leads from the Valaisan Val d'Hérins) at Migliandone on the Simplon, in the neighbourhood of St. Moriz and Camfer in the Upper Engadine, &c. But the normal granite occurs with additions, which completely change its character. This is the case in Mont Blanc.

There the quartz is a glassy grey, the felspar white; the mica is dark green, crystallised in prisms, and does not glitter; whilst bright green shining flakes of talc distributed through the mass give its characteristic colouring.

De Saussure, one of the most intelligent founders of Alpine geology, believed, on his first visits to and ascent of Mont Blanc, that he was standing upon one of the oldest mountains of the earth, and therefore called the rock "protogene," *i. e.* the firstborn. The name has been continued, though no longer appropriate, since his time.

Most of what is called granite in the Central Alps is granitic gneiss, called in the people's language "Gaisberger," because the highest mountains climbed by the goats ("gaisen") are formed of it. It is the substance from which the atmospheric influences carve those strange towers of rock and picturesque ornaments which in Chamouny are significantly called Aiguilles, from their sharp points. From this so-called "primeval material" are formed the wondrous spikes of stone which ornament the summits of different mountains, or strike up here and there like outposts through the far-stretching wastes of névé. We should see many more of these slender rock "needles," if many of them were not engulfed in the perpetual snow. Here the Achilles-heel of the apparently indestructible "urgestein" betrays itself. Gneiss is, as already stated, of stratified, tabular structure. In the elevation of the Alps, the strata of gneiss were raised and often placed vertically on the edges of fracture as the immediate envelope of the granite. The mass must have been of various hardness at different places. At any rate, whilst particular parts have withstood the action of weather without injury, others have been overthrown, gnawed into, and destroyed by the atmosphere, to such an extent as quite to have disappeared, and left only isolated points behind. Examples on a large scale are the Aiguille Verte, the Aiguille du Moine, the strangely shattered Aiguilles de Charmoz, the Aiguilles Rouges, all the mountains on both sides of the valley of Chamouny, the Schreckhörner and

Grindelwald Viescherhörner in the Bernese Alps, the whole southern wall of the Bergell in the Grisons, &c. &c.

But a different kind of atmospheric action attracts our attention in the Alps, and that in the most singular manner, and in places where the explanation is not at once obvious. This appears in the so-called "Devil's Mills" or "seas of rock" on the highest points of many isolated mountains. The Sidelhorn close to the Grimsel is one of the most visited points of view in the Bernese Alps. It is easily reached from the hospice in two or two and a half hours. The nearer one approaches to the summit, the more do the vast rock-ruins accumulate, piled wondrously over each other, till at length the highest point is covered with a perfect chaos of such loosely massed granitic blocks of gneiss. At times a certain disturbed stratification may be observed, something like plates laid upon each other; then again, in other places, a tolerably regular steplike formation; but in general they lie without recognisable order. This phenomenon, which frequently occurs on summits, is the result of a weathering of the granite, but of that kind in which more or less the scaly structure was once predominant. The brothers Schlagintweit represent in their Atlas * such disorganised scales of gneiss. As the fanciful Jean Paul employs the beautiful picture, "graves are the mountain-tops of a far new world," here in reality the mountain-tops are graves of a past world.

The grandest and most imposing masses of granitic rock are only to be found in the Central Alps. There they often tower in such fearful sublimity, like vertical walls of rock-palaces, above the deep valley-hollows, that one is startled at their greatness. He who has never seen the

* To the "Neuen Untersuchungen über die physicalische Geographie und Geologie der Alpen."

dusky pyramid of the Finster Aarhorn from the "Abschwung" on the Aar glacier, as it rises in naked sublimity from the snow-beds to the clouds—he who has not journeyed round the south-east of Mont Blanc and seen its central mass from the Cramont, or the giant rocky brows of the grand Cornier, Dent Blanche, and Weisshorn from the depths of the Einfischthal—will hardly be able to construct for his imagination a right measure of their colossal relations. And yet all these granite giants are far exceeded, as to the impression which they make upon the eye, by that steep abyss into which the Monte Rosa sinks at the head of the valley of Macugnaga. It is the greatest vertical magnitude of the European continent. The limestone Alps, the Diablerets, Dolden and Gespaltenhorn, and the Blümlis Alp, show mighty rock-fronts, but they shrink in presence of these granite walls to masses of the second order.

We called granite the historic stone of the earth. It is so in the Alps in more than one respect. Its solemn rock-walls were often memorials of great deeds, which may be compared to the sublimest moments of classical antiquity. The undaunted Russian Suwaroff, a modern Epaminondas, who would rather have been buried in the clefts of the rocks than give up his post, when his columns had repulsed the French under Gaudin in the narrow valley of Tremola, left the laconic words "Suwarow Victor" carved in the granite wall for an everlasting remembrance. Next day the cliffs of gneiss were witnesses of equally heroic deeds where the Devil's Bridge spans the stormy waters of the Reuss with its bold arch. Over the granitic deserts of the St. Bernard, Bonaparte led his army to the victory of Marengo, in May, 1800; and when the Simplon pass, the first great Alpine road, had been pierced by his orders, he had carved in an opening of the gallery of Gondo the

words "Aere Italo, MDCCCv. Nap. Imp." Andreas Hofer, the host of Passeyr, was born in the granite country, and between granite rocks he fought his glorious fights for the freedom of Tyrol. Retiring further back to ancient times, we meet with deeds wrought upon it, as hard-grained and firm almost as the granite itself. Benedict Fontana breathed out his hero-soul upon the gneiss crystals of the Malser-haide with the joyful words, "Go on stoutly, my friends; don't be disquieted by my loss—it is only one man gone. To-day you may save your free Fatherland and the free confederacy. If you are beaten, your children are slaves for ever." Those are words of granite and primeval rock; it is as if the character of the rock had passed into the people's blood. And then the mighty December fight of 1478 in the Livinenthal, where a handful of herdsmen destroyed ten times their number of Milanese under Count Borelli till the snows of Bellinzona were red with their blood. Then the hero-graves of the 3000 confederates at Arbeno who sank in a despairing fight before 24,000 Lombards in 1422;—the double blood-baptism of the Valaisans at Ulrichen and on the Grimsel in 1422, and many other proofs of manly courage and bold deeds:—are they not remembrances, which have carved their memorial in letters of flame for men's hearts on the rock-tablets of these granite colossi?

But the dull stone tells us of still more, of times lying further back, of an epoch when the Alps stood as they stand to-day, but when the human race was not. These memorial-stones are the "erratic blocks."

CHAP. III.

ERRATIC BLOCKS.

YES! many towns of the Alpine land stand upon ruins; on walls of blocks and rock fragments, which have come from the central chains of the mountains. Certainly this base of ruins does not everywhere lie open to the day. The workman who is laying the foundations of a new house, or the miner who is digging for a new well, comes across it at the bottom of the highest layer of soil. But not merely covered up in the earth, but in the open air, on the meadows and forests of the hill-country, even high up on the outliers of the Alps and on the Jura, blocks of stone are to be found which, from the nature of their material, must have had their home far off in the central Alps, twenty-eight geographical miles away. They have been called "foundlings" or wandering blocks. They show partly rounded surfaces, like rolled stones from river-beds; partly fresh, sharp-angled lines of fracture, as if they had just been severed from their parent rocks. They are of all sizes, from that of a skittle-ball up to bodies of such cubical contents that from the substance of a single one lying in a field at Höngg, near Zurich, called the "red ackerstein" (field stone), a solid, respectable two-storied house was built, which bears the following inscription:—

"Ein grosser rother Ackerstein
In mancher Stück zerbrochen klein,

Durch Menschenhänd und Pulversg'walt
 Macht jezund dieses Hauses G'stalt.
 Vor Unglück und Zerbrechlichkeit
 Bewahr es Gottes Gütigkeit."*

It once belonged to the Count Benzel-Sternau. But the block of which the house was built came from the recesses of the mountains of Glarus, perhaps from the Freiberg, or out of the Sernfthal.

Science has had little trouble in answering the question "Whence?" From the structure, colour, and mineral composition of the granite, gneiss, mica, verrucano, and slate erratics, and from the position of their site in regard to the valley systems of the Alps, it could easily be deciphered from which of the central masses they had come. But the "How?" of the transport caused many disputes among the investigators of the last fifty years. Some suspected that, at the last elevation of the Alps, Nature had taken to throwing vast volcanic bombs, and that these fragments had then been ejected and cast for miles over hill and valley. This bold fancy was soon put down by the establishment of the facts,—first, of the regularity with which these blocks were deposited in a line on the mountain slopes; secondly, of the relations of particular areas of deposit to the mountains whence the blocks were derived. Others supposed enormous deluges which had rolled down these burdens, often weighing hundreds of thousands of hundredweights, from the Alps,—an

* "From out a great red 'acre-stone'
 To many little pieces blown
 By hand of man and powder's blast,
 Was made this house so firm and fast.
 God in His mercy keep it sound;
 Let no ill-luck its walls confound."

hypothesis the physical impossibility of which was speedily demonstrated. At last, when the theory of the nature and motion of glaciers, first treated of by the Valaisan engineer Venetz, and worked out by Forbes and Agassiz, cleared up a number of the strangest phenomena of the Alps, the conclusion was arrived at, *that the erratic blocks have been carried to their present position by former enormously great glaciers, which must have reached right into the Swiss "middle-land."* As will be shown further on, the glaciers move slowly from the heights to the valley, bearing on their backs the stones which have crumbled from the rocks on their banks, down to the place where they melt away in the warmer temperature and deposit their burden. These walls of stone which are heaped about the end of a glacier are named frontal moraines.

The existence of such mounds heaped up in the shape of horse-shoes in the Swiss middle-land, *e.g.* at Berne, Sursee, Bremgarten, Zürich, Rapperschwyl, &c., gave the first proof of the transport of the erratic blocks. In Zürich the Promenade hill, the heights on which the cathedral, the church of Neumünster, the Lindenhof, &c., stand, are remains of such extinct frontal moraines. A second proof was drawn from the fact that the erratics, even when formed of the hardest rock, present scratched lines and furrows exactly similar to those of rocks scored by existing glaciers. By means of the vast pressure of the superincumbent ice, the small, intensely hard and sharp crystals of quartz carve lines in the rock, which seem to have been cut by a glazier's diamond. The rolled blocks which have been carried down by the wild Alpine torrents do not present these scratches. Thus the erratic blocks carried as it were Nature's handwriting like the passport of their previous wanderings, with the *visa* of every valley through which they have passed.

The third and most important argument for the transport of these erratics by extinct glaciers is to be found in the "Rundhöckern" (*roches moutonnées*). In most Alpine valleys whose walls are formed of weather-beaten granitic rocks, are to be seen in certain places (often 1000 feet above the present level of the valley) rounded surfaces regularly striped and smoothed, which have often received so fine a polish as to glitter like mirrors in the sun. On the descent from the Todtensee to the Grimsel hospice, and thence to the Höllenplatte, on the field of ruins by the St. Gothard hospice, and in hundreds of other Swiss places, one may see and feel such "roches moutonnées," and, where they are not overgrown by the sulphur-coloured lichen (*Lecidea geographica*), may wonder at their polish. The same phenomenon also appears close to the glaciers, by those, for example, of the Görner, Viesch, Aletsch, Findelen, and Zinal valleys: we can follow it from the glacier bank under the ice till far down the valley walls; we can follow it in horizontal lines for hours down the valley, uninterrupted by the change in the stratification or the nature of the rocks. Such proofs increase the probability to a certainty that these valleys, now partly overgrown with ancient forests, were once the beds of gigantic glaciers. There is finally one proof in the regularity of the deposition of these erratics, which fully supports and completes the others. By "regularity" is to be understood not the uniformity of deposition already mentioned along lines of equal elevation upon the lower outlying hills of the Alps, but the regular grouping of the blocks according to colour and material of the stone. For example, on the two sides of a broad valley which again branches out into various side-valleys amongst the higher mountains, the masses of granite, diorite, gneiss, or limestone are not to be found scattered up and down amongst each other, of all

colours, green, red, white, and brown, of coarse and fine grain, fibrous and laminated: they will be in separate groups. Let us make this a little clearer. Let us think of the glacier as a main stream, arising from the confluence of many mountain rivers, each of which again receives its due supply of water from various sources. Suppose again that each of these sources brings down fragments from its rocky shores. They would probably mix up the stones which they brought down, as the water is mixed up in its course. But the glaciers as solid bodies of ice (if we keep to the image of a river system) do not mix, when they come together in the broad valleys, like the flowing moving water, but continue their journey side by side, even though apparently united. Thus the long lines of ruins (moraines) resting upon them show far off, of how many side-glaciers the main glacier is composed. Thus too the stones from different valleys remain separate, and thus the former gigantic glaciers deposited their blocks only on that side of the valley which corresponds to the lateral valleys lying further up in the mountains. The well-known Swiss geologist, Escher von der Linth, has published a map, founded upon the investigations of many years, of the area of extension of all the blocks found north of the Alps in Switzerland. Such erratic blocks are also to be found south of the Alps. The Lombard inland waters, the Lago Maggiore and the lakes of Como and Garda, are closed in at their mouths by just such walls of blocks as those of the lakes of Zurich, Sempach, and Baldegg in Switzerland. The same phenomenon appears in other mountain chains. The Pyrenees, the Scotch Highlands, the Swedish Kjölen, the Vosges, the Cordillera of America have their erratics as well as the Alps. The phenomenon which thus occurs in both hemispheres leads therefore to the conclusion that a period of

universal cold must once have existed, which was certainly the latest event in the history of our planet's formation; for where such blocks are to be found, they always appear as the latest deposit, which came to its present place only since the Alpine valleys and gorges, river-beds and lake-basins, received their present shape.

CHAP. IV.

“KARRENFIELDS.”

THE expression used to describe the appearance of the earth on the first day of creation was transferred to the boundless sandy plains of Africa and Asia, and these inhospitable arid levels were called “wastes.” The Alps, too, have their “wastes,”—their regions where Nature seems utterly dead, where the regenerative power of the everlasting mother is extinct; but they present different forms, different materials, and very different surrounding circumstances from the Sahara. They are generally sought for above the snow line, in the inexhaustible reservoirs of *névé*, and on the glacier slopes, where the piercing cold threatens to nip in the bud all organic development. But, as we shall presently see, death is by no means so triumphant there. On the contrary, the pulses of the earth’s life beat with regular strokes even in these deserts, fulfilling steadily, though almost imperceptibly, its task in the economy of Nature’s household, and assisting to preserve the whole. Here, therefore, our analogy is not to be sought. And, in fact, there are still more barren and death-like regions in the mountains than the wastes of snow,—broad extensive tracts in the untrodden wildernesses, which, bare of all vegetation, lie in rigid and everlasting resignation. These are the “*Schratten*” or “*Karren*” fields, called in the Romansch “*Lapiaz*.” High up in the

mountains, by the side of the frequented passes and the lively Alpine pasturages, at a height of from four to six thousand feet in the limestone Alps, lie bare, naked plains of stone, often extended almost at a dead level for hours, which are so furrowed, and crossed by deeply cut channels, that they look as if a swelling sea had been suddenly turned to stone, and left behind an inextricable net of crested waves. Below they are so terribly split and gnawed into by gutters, yards in depth, that it is impossible by any means, by jumping, clambering, or careful balancing, to make way across them; for the remains of stone between these channels run across them like narrow dams, as sharp as the edge of a knife, and then suddenly break off, interrupted by cross-cuttings. They appear again like combs whose different teeth are broken off at all kinds of heights,—a plain which has been as it were hacked, hollowed out, sawn through, and carved by giant instruments,—a stony sea splintered and cracked, full of the strangest forms, which often resemble glacier “needles.” Between them are deep funnel-shaped holes, like the craters of a volcano; or they sink into canals which disappear underground. Then again they open into bowls, yards in breadth, and with bottoms riddled through like a sieve. In other places a certain law of erosion seems to have prevailed in this chaos, for the masses of ruin have nearly the appearance of cells in a beehive, on which account the shepherds call them significantly “Steinwaben,” stone honeycombs. They are, indeed, a miniature picture of the most fearful destruction.

All this is indeed a result of weathering, of the imperceptible but powerful operation of the waters from glaciers, snows, and rains, of the withering burning heat of the sun, and of the splitting, severing, and bursting

frost, of the most unchecked action of atmospheric influences upon the stone. And because this weathering is more apparent on the limestone than elsewhere, and because even the fossils contained in it occur only in fragments and decay, geologists call it "Rudisten-kalk," or, from its organic remains (*Caprotina ammonia* and *gryphoides*), "Caprotin-kalk." Besides this, it has the popular name of "Schratten" limestone, because "Schratten" means amongst the people of the Alps "mountain splits and rents," which perhaps is derived from the German word "Scharte," in English "shard." Finally, because in the bare naked rocks, especially in Unterwalden, the "Rudisten" occur frequently, and form strange unusual figures on the surface of the stone, it is also known as hieroglyphic limestone.

It is evident that this limestone has a very peculiar tendency to dissolve, which has produced the channelling. As not the least particle of earth finds a place on these decaying bones of rock, which in summer reflect an unendurable heat, and as in spring the waters which collect after heavy rains, or from the melting of the snow in the subalpine region, hasten down through the hollow gutters and cavities into the trackless bowels of the mountain, to appear again in springs at its foot, it is evident that these plains do not afford the necessary conditions for the growth even of the hardiest plants. As far as the eye can reach over the comfortless, pale, monotonous rocky levels, it looks dreary and deathlike. Where no flower blooms to open its cup of honey, there no insect hums, not a butterfly flutters, not a beetle whirrs past. Where no weed, not a blade of grass, can find nourishment in the clefts of the rock, where not even a moss can support its hardy existence, there not the smallest marmot will remain. Where all means of passage is so destroyed as

in these Karrenfields there no chamois will wander. Even the birds seem to avoid these wildernesses. No mountain-crow or raven, no partridge or ptarmigan, no falcon or eagle is ever seen to alight on them. Hence the Schrattenfields may well be called the deserts of the Alps. Where, however, these Karrenfields border on the meadows, so that earth may be carried by the water into their depths, the most luxurious vegetation which grows on the Alps may be found amongst them. Such places often serve the root-diggers as the best hunting grounds for their dangerous trade.

As universally, where anything dismal, inexplicable, and extraordinary is to be found, popular superstition assumes the action of supernatural power, so here it takes refuge in calling up infernal powers and evil spirits. Dwarfs and gnomes, called “Schrättli” by the people, have bored and crushed the rocks. It is nothing to them to pierce through the solid earth like moles. Another legend tells how the Schrattenfluh at Entlebuch was once one of the best pasturages in the country, and belonged to two brothers who ruled over it in common. One of them having become blind, they resolved to divide their possessions, and the one who could still see was entrusted with the division. He however took advantage of his blind brother, put the boundary stones wrong, and took for himself the largest and best part of the Alp. When the blind man was told of this, he spoke to his brother about it. The brother however forswore himself saying, “the devil might take him and destroy his meadow, if he had not shared it quite fairly.” Then arose a fearful storm, the hills shook, Satan appeared, and the oath was fulfilled. The devil stripped off all the turf and useful soil from the mountain, and that with such zeal and envy, that the

marks of his claws are still to be seen in the slope of the channels in the rock. Whilst the blind man's meadow remained unhurt, his brother was carried off to hell.

If we except the machinery of the story, there is real and deep sense at the bottom of this legend. The unreasoning hand of man, which robbed the mountains of their forests, so that the ground was left unprotected to be destroyed by the weather, was the devil's fist which laid waste the mountain.

It has been sought to represent the Karrenfields as the result of erosion by former glaciers, inasmuch as they often appear in company with other unmistakable traces of glacier-action. More accurate investigations have sufficiently shown that this hypothesis is untenable. The sliding of the glaciers, of which we have already spoken in the chapter on granite, has the special property of smoothly and regularly rounding off the rocks, whereas the proper Schrattenfield is irregularity and unevenness itself.

The most important and deeply marked Karrenfields are in the Cantons of Appenzell, St. Gallen, Glarus and Schwyz ; the most celebrated and best worthy of a visit is that of the Silberer. It is reached in two and a half or three hours from the pastoral lake of the Klönthal (the pilgrimage of all tourists since the opening of the railway to Glarus), by following the path over the Prigel to the top of the pass, and then turning to the left. The limestone surface of the Karrenfield on the Silberer is so white that, seen from a distance, it may be taken for a snowfield. Other Schratten are on the northern slope of the Churfirst, on the Scherenberg near the Leistikam (which is exceptionally almost covered in many places with Alpine roses), then on the Messmer on the western side of the Säntis chain, along the Silberplatte,—on the Kerenzerberg,

easily accessible by the railway on the Wallensee,—on the mountains of the Wäggithal on the Fluhbrig, Frohnalpstock on the Bauen (Lake of Lucerne), on the Sättelistock, on the Brünigpass, on the Kaiserstock, on the Rawyl and Sanetsch passes, Tour d’Ay, Tour de Mayen, and many other places.

CHAP. V.

NAGELFLUH.

WHEN you, my dear reader, on your Swiss summer's journey, are travelling from Germany over the Lake of Constance towards the mountains, through the pleasant land of Appenzell, or through the industrious country of Joggenburg, or still farther west, through the Emmenthal or Entlebuch; or, when as you are making a stay, which strengthens you in body, heart, and soul, in the charming Hôtel Bellevue, at Thun, with its park-like neighbourhood, its friendly landlord, Herr Knechtenberg, takes you past the English Chapel to the Pavillon Saint Jacques, whence you look down over a rich picture, over the proud mediæval castle built by Herr von Rougemont at an expense of a million and a half of francs, over the Chartreuse and the Lake of Thun, across to the Niesen, the chain of the Stockhorn, and the great circle formed by the snowy domes of the Jungfrau, Mönch, Eiger, and many others,—or, when you ascend the Rigi, or even the Freudenberg above St. Gallen, in all these cases your eye falls upon walls of rock, which, to the practised eye are not, properly speaking, rocks, for they look more like the fronts of enormous gravel pits. You should look at this conglomerate a little nearer, and spend a few minutes in examining it. Your loss of time will be richly repaid, if you are a friend of natural sciences.

This strange formation is "Nagelfluh," a tertiary de-

posit, a kind of natural storehouse formed of flat and rolled stones, belonging to the molasse period, and thus one of the most recent deposits with which we are acquainted. Nagelfluh occurs in thick masses, and through an area of leagues in breadth, only on the northern slopes of the Alps; and there forms the first outlying heights of the mountains. In the Jura it only occurs in detached masses as in Pruntrut, Delsperg, in the celebrated rock-gate of the Pierre Pertuis, in the cool hermit's gorge of St. Verena, at Solothurn, round Aarburg and Aarau, and in the Devil's Cellar at Baden. Besides these places, the nagelfluh is found only on the borders of India.

This conglomerate (allied to the so-called "pudding-stones") consists of enormous layers, often several thousand feet thick, of deposited rolled stones, which are connected by means of a cement containing lime, and effervescing under the action of acids. It is often so firm that both stones and cement form a uniformly hard mass, and when broken, split into flat surfaces of fracture, passing equally through stones and cement. This firmness is so remarkable, that the nagelfluh of some places, that, for example, known as Degersheim and Solothurn marble, has been used by stone-masons for large fountain basins, and monumental work, and even for millstones. The size of the included stones varies exceedingly. Some are found lying close together of the size of grains of corn, so that the deposit has the appearance of a fine-grained sandstone. Others, again, are huge blocks, cubical yards in size.

All this however would not make the nagelfluh a specially interesting natural production, were it not for two circumstances which have not hitherto been satisfactorily explained. The nagelfluh consists, like all gravel, of fragments of stone of the most various shapes, spherical, oblong, or with both round and flat surfaces. According

to its colour and quality it has been divided into the two chief groups of variegated and limestone nagelfluh. To the variegated nagelfluh belong those conglomerates which as their name expresses are splendid with a rich mosaic of colour. There we find fiery red spheres of porphyry close to clear granite pebbles of a soft apple-green, warm violet coloured cylinders of spilit close to deep green ovals of serpentine, yellow ochre-coloured rounded flints by flesh-coloured and veined spheroids of felspar. The limestone nagelfluh is less brilliant; grey, blue, and blackish tones prevail in it. There are however specimens which vary from this, such as the nagelfluh at the foot of the Speer, near Wesen, on the Wallensee, which has almost the appearance of German sausage or Gotha brawn. For fragments of Felspar are baked into the dark red cement (which contains iron), looking like fat bits of bacon; and other stones containing lime may without much stretch of the imagination be taken for bits of crackling and forced meat. The curiosity-seeker may find fragments of this plaything of nature close behind the railway station at Wesen.

One circumstance still unexplained is this,—that fragments of rock are found in it (even in great numbers) which are either not found in the Alps at all, or at any rate only in the southern valleys (whose present river systems flow towards the south, such as the Rhone, Ticino, Inn), and that fragments of rock are entirely wanting which one would have expected to find in great numbers, because they occur frequently in the Alps. No other supposition is possible than to assume that the nagelfluh is derived from mountains which have been completely destroyed in some great convulsion of the earth, then swept away and rounded by friction in the primeval sea, and ultimately deposited in great masses, enveloped in a

mud cement, and afterwards raised again from the depths when the Alps were elevated from the bottom of the sea.

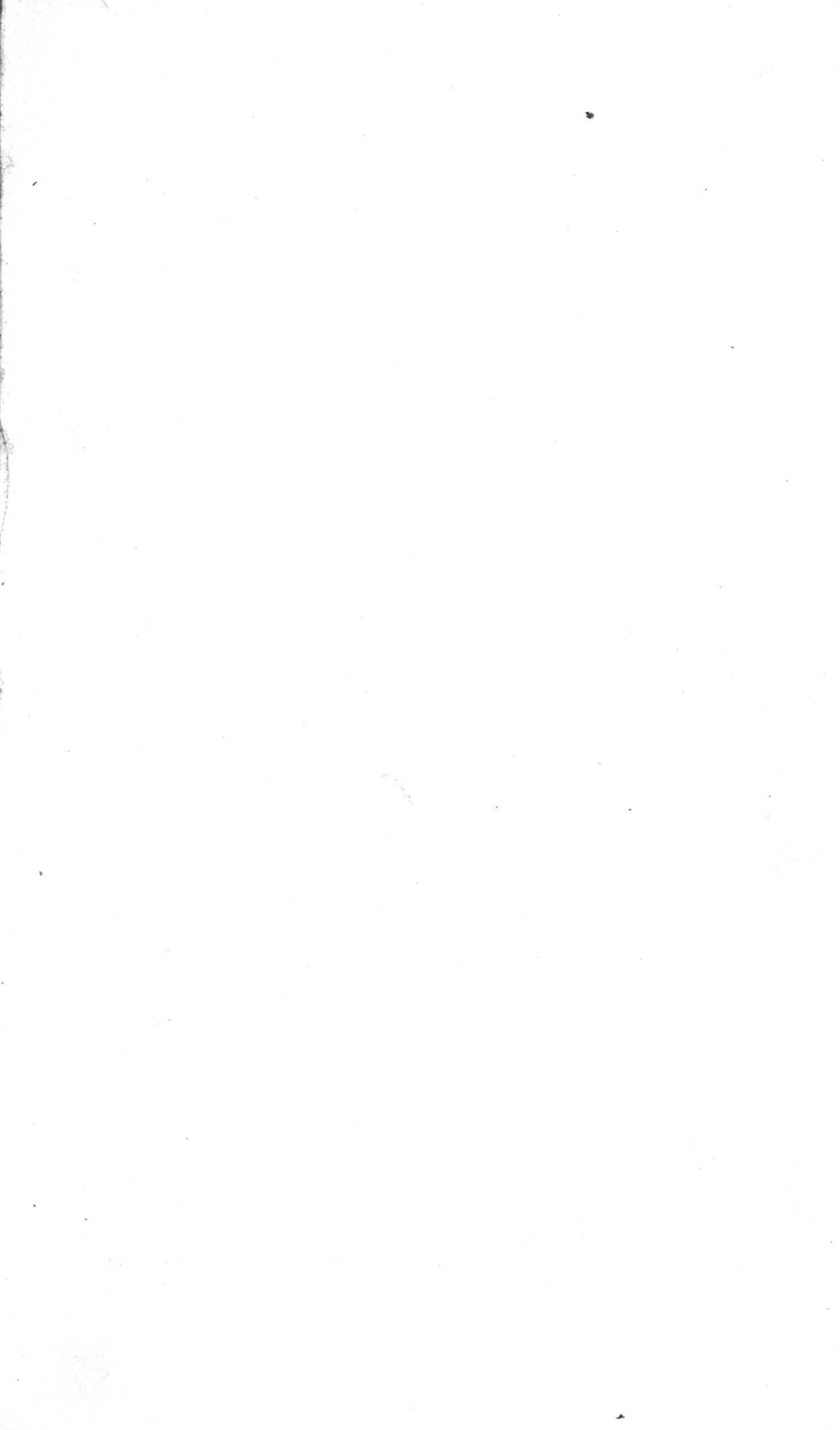
A second still more interesting but still less explicable circumstance is that of the impressions. If we search only for a short time the bare rocks of nagelfluh (those, that is, whose binding cement is not so hard, but that the pebbles can be easily extracted), we shall find specimens of these, which have received deeply moulded impressions from their next neighbours, much as if one was to stamp any hard object into fresh kneaded bread. The two stones, however, are generally of equal hardness, and stone No. 2, which made the impression in stone No. 1, has again received on another side precisely similar crushings or indentations from stone No. 3. As we must suppose that the pebbles, before they were polished down, were hard and brittle, it is difficult to explain how they could have received such impressions from their hard neighbours.

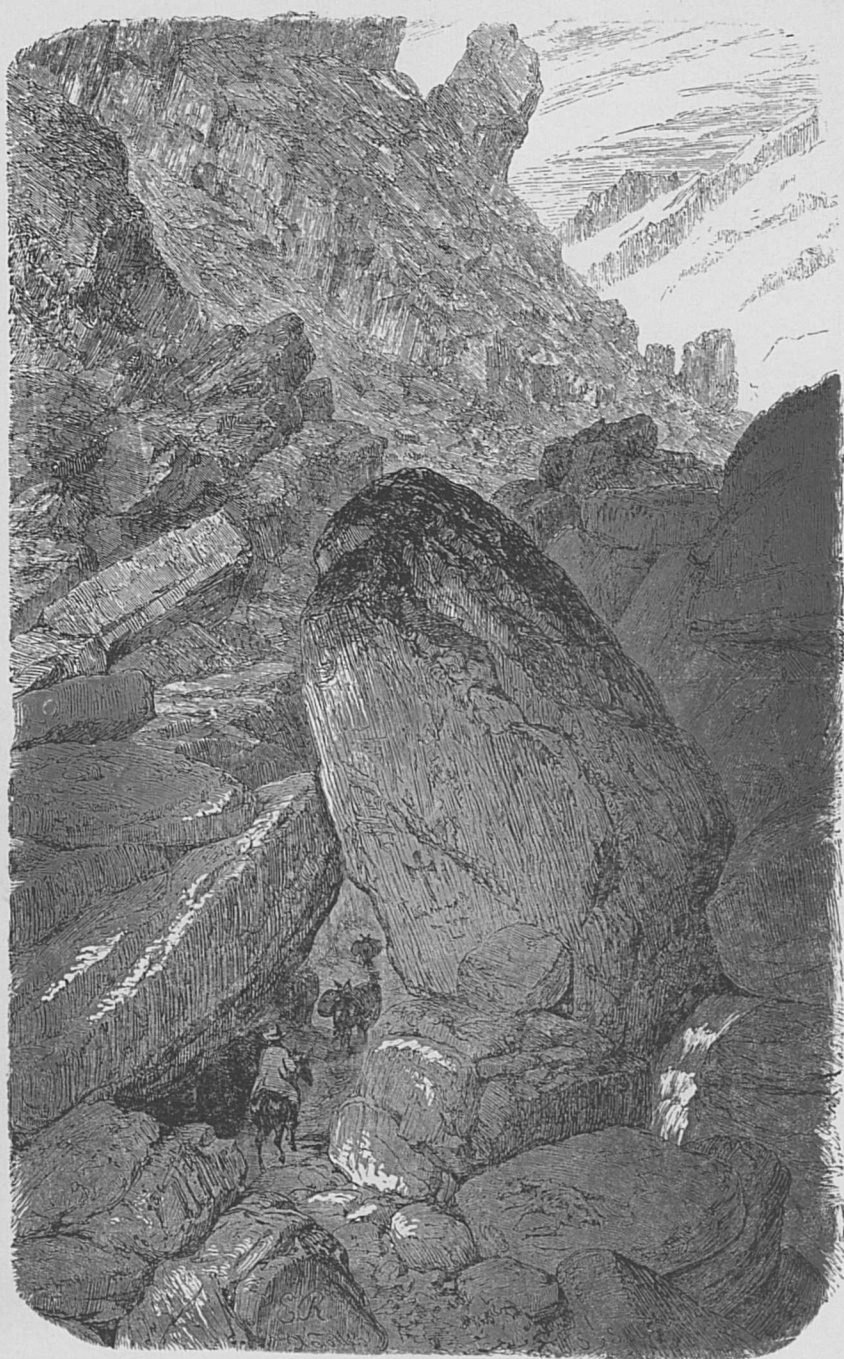
If we assume that these pebbles were still tolerably soft when deposited, and therefore easily received impressions, a similar degree of softness must be assumed in those stones which produced the impressions. Two equally soft bodies may certainly flatten each other, but one can hardly penetrate into the substance of the other. But there occurs another phenomenon to prove that all the nagelfluh pebbles were already very hard when they were enveloped in cement,—namely, the mirror-like; striped, and shining polish, which they display in many places. Examples may be found, which, treated by the lapidary, shine in the sun like bright panes of glass. Others show sharply scratched and numerous lines which make the grained limestone appear like fibrous asbestos; and others again where nature's wonderful laboratory has made such energetic incisions as if the stone had been carved by a

diamond chisel. Most of these polished surfaces show a metallic lustre. No doubt the whole phenomenon has its origin in a gigantic lateral pressure produced by the Alps on the elevation of the masses, in consequence of which, the stones slide over each other with incalculable vehemence, and as they were heated by the friction mutually polished each other. Such a polished stone gives a beautiful example for microscopic examination. If it be placed under the instrument, and either the light of a lamp, or still better, of the sun, reflected from it at particular angles, indescribably beautiful effects of colour are produced. A kaleidoscope, in which the most brilliantly coloured pieces of glass were inserted, could not produce such a glistening, whirling and struggling play of colour as the tiny polished crystals of the modest grey limestone pebble.

At one time the purest and most fiery prismatic colours group themselves into a circlet of rosettes, or into stars with rays of various colours, at another they resemble the thousand-hued girandole of the fire-worker, or interlaced diamond twigs, whose ends seem to run into the very heart of the stone. Then again glimmering, irregularly crossing glassy branchwork, or architectural façades with string cornices, pilasters, and crossing ribs like a fairy palace made by spirit hands for Oberon—in short, a world in miniature full of strange phantasmagoria, reveals itself to the astonished eye. And yet it is an invisible crumb from the great ruin heaps of a past world, and reminds one of Byron's "Manfred :"—

"Mountains have fallen,
Leaving a gap in the clouds, and with the shock
Rocking their Alpine brethren, filling up
The ripe green valleys with destruction's splinters;
Damming the rivers with a sudden dash,
Which crushed the waters into mist, and made
Their fountains find another channel."





LANDSLIP.

CHAP. VI.

THE LANDSLIP AT GOLDAU.

THE framework of the earth is in a state of uninterrupted ruin and renovation. That great cycle of creation, which we recognise best in the germination, growth, death, and decay of plants, because they recur in a period within the grasp of our perceptions, takes place equally in the very fabric of our earth, although its epochs embrace thousands of years. Here, however, there is a change rather of form than of material.

If we contemplate the ground upon which we walk, the garden and arable land which bears our corn and our wood for burning and building, or the dust of the roads which the wind whirls and confounds high in the air, if we examine it all carefully in the microscope, and divide it into its simple elements, we should find amongst innumerable particles of half or quite destroyed animal and vegetable organisms, amongst scarcely recognisable infusoria and snailshells, just as many and even more small fragments of ancient mountains. A varied mixture of glassy splinters of quartz, and coloured flakes of schist, glistening crystals of mica, and angular grains of porphyry, transparent stones of felspar, and dense particles of limestone would appear, which have been crushed to atoms, and are going through a process of restoration.

This transforming energy and the continual change of

our earth's crust which it produces can only be perceptibly recognised where the moving powers are developed on the largest scale in the service of nature, on the sea-shore and in the mountains.

On the sea-shore or on that of inland lakes and even of rivers we see new deposits of earth and stone which are called littoral formations. New islands spring up from the depths of the ocean to enlarge the region of firm land, whilst in other places the uninterrupted working of the waves and the surge is continually washing away solid walls of rock and submerging them in the depths.

This levelling process shows itself far more strikingly in the mountains. Every rapid melting of the high snows in the spring, every thunderstorm with its vehement showers of rain, every glacier as it slides down, is sending yearly innumerable ruins of rock down from the hills to the valleys, to the Alpine meadows and lowlands, and to the lake basins at their feet. If we could calculate roughly their probable influence, we should find that in some vast period of time the atmospheric influences would lead to a complete levelling of hill and valley, were it not that every now and then unforeseen catastrophes occur which cause an interruption in our reckoning.

The dweller in the Alps calls such events and the districts that they lay waste, "Rüfe," "Steinrieseten," "Gante," or "G'schütten," and in all the broader valleys of Switzerland, Tyrol, and the Alpine countries shut in by steep mountain-walls, such deserts of ruin may be seen bare of vegetation, resembling streams turned to stone. In violent storms they have in a few hours covered with sand and with their detritus valuable cultivated or meadow-land and destroyed its power of bearing for many years.

These are not to be confounded with the proper rock-falls and landslips, which from time to time visit the Alps,

and belong to the most fearful of natural occurrences. Almost all are produced mediately or immediately by the action of water. Either the water continually and unceasingly pierces, gnaws away and bursts the narrow joints in the very hardest kinds of rock, penetrating into them imperceptibly, freezing in the winter and tearing them open like a wedge by the expansive power of the frost, till the masses of stone, separated from their parent rocks, and completely loosened from their natural base, at length, when the summer comes and the penetrating ice melts, lose their equilibrium and fall into the valley ;—or else the superposition of different beds and the slight coherence of the adjacent layers and the direction of their “dip” (as geologists call it) are causes of the landslip. This last can only happen in those Alps which are not formed of crystalline rock (granite, gneiss, mica-schist, porphyry, Syenite, and generally the rocks containing felspar) like the central Alps, but only of sedimentary deposits, as was previously explained. Here the action of water is direct, especially of the rain and snow water which penetrates in great abundance into the earth between the layers of rock, and dissolves their connection.

This is especially the case in mountains whose lowest mass consists of compact and impervious layers, into which the water can sink but slightly. When decaying and easily destructible material is placed upon those, such as red marl, for example, and above this again a considerable thickness of a different kind of rock of less density, such as sandstone and nagelfluh, or still more any rock through which the water easily percolates, it follows as a natural consequence that either the water trickles through till it comes to the lowest and densest rock and runs off in subterranean canals, according to the dip of the strata, to appear again somewhere as a

spring through a thousand internal arteries and holes ; or if it cannot find a sufficient outlet, it completely loosens and dissolves the intermediate layers and changes them into mere soft slime.

It now depends upon the course of the weather and the nature of the locality, what is to become of this half fluid layer of earth. If very dry weather occurs after lasting rains, it grows hard again, the water is gradually evaporated, the mud dries up, and the threatened danger is averted. But if the Föhn or west wind continually drives new masses of rain into the hills, and if no lasting dam has been opposed by nature herself to the weakened layer, the whole mass breaks away, and a "Schlamm-lauine" (slime-avalanche) is the result. Wherever it directs its devastating but uncontrollable course, it overwhelms, fills up, immures, and often covers for fathoms in depth whatever stands in its way, like the lava of a volcano. Whatever it reaches is irrevocably destroyed. By such a stream of mud a great part of the charming village of Wäggis, by the Lake of Lucerne, was annihilated and overwhelmed in July 1795. It was announced on the night of the 15th of July by a singular monotonous roar, which to the fancy of the people seemed to come from the cellars. When day began, the inhabitants saw with horror a thick dark red stream of mud, several fathoms high, and perhaps a mile broad, rolling down towards the village. Its motion was so slow that all the portable possessions of the villagers could be carried away. It lasted a good fourteen days, till the travelling stream of mud reached the lake shore ; but a number of houses and excellent pieces of land were a prey to the catastrophe.

Such mud avalanches, however, when they find no outlet, are indirect causes of falls of rock. The layers of rock, resting at great inclinations on the layer of mud,

tear themselves loose by their own weight, and slide down the slippery earth to the valley.

A storm in the ocean, a mountain spitting fire, the blaze of primeval forests in America, the simoom in the desert, may all chill a man's blood in his veins; but no storm in the open sea, when the sailor sees destruction in a thousand watery graves, no breaking forth of a volcano towards heaven, no burning of the American forest, can cause greater horror than that fearful moment when the mountaineer calls to his wife, children, and neighbours to "run, for the mountain is coming!"

There is only one phenomenon which can be compared to a mountain fall, for appalling danger, and that is the earthquake. When a mountain comes down, all that lies before its crushing power, is doomed to death, almost at the same instant that it is warned of danger. Only think, of those stable mountain masses, which, since the memory of man, have been enthroned above men's heads in death-like indifferent calm, as it were a building raised by Nature for time everlasting, suddenly deprived of their supports by an invisible hand, set in motion, wavering, tearing themselves loose, and storming down with the speed of lightning, into the peaceable valley below.

Such a fearful event destroyed the villages of Goldau, Rötten, Busingen, and Lowertz, in a few minutes, by the descent of the Rossberg, lying north of these places.

The years 1804 and 1805 had been very rainy, and the year which followed them continued to discharge unusual quantities of rain upon the Alpine land. Midsummer was quite remarkable for its continuous rain, which, towards the end of August, and especially on the first of September, threatened to take the form of absolute deluges.

The landscape of a plain country looks dismal enough after four weeks of rain, in its saturated flooded state,

but it cannot be compared to a mountainous land after the same period.

From every gorge and retired valley destruction peeps forth, and is everywhere shaking and eating away what resists. The earth-stained and swollen waters flowing from every mountain-slope, foam and roar in channels and runlets cut out by themselves. All the hollow ways are deep in water, and the variegated hieroglyphically-marbled pebbles (deprived of the cement in which they were imbedded), which before were unnoticed in their dull colours in the earth, shine out so transparently bright (as though polished by the stonecutter) that they present a natural diluvial mosaic in their heightened colouring. The bare root-network of the pines and larches, of the sycamore (*acer pseudo-platanus*), and the Alpine alder (*alnus viridis*), and of the bristly juniper (*juniperus sabina*), and other trees, standing by the wayside, hangs down over it all sodden. Wherever the searching action of the water has borne the loose soil of the forest down to the valleys, the proud stems, those patricians of the vegetable world, sink down by their own weight, while their trunks, felled by the weather, encumber the free passage through the forest. The fissured scale-armour of the trees' bark, filled out by the over abundance of rain, loses its warm, healthy, brown-red ochre colour; and trunk and boughs stand up, all dark in the black pillared aisles of the forest. That legendary secret dimness of the woods is wanting, which resolves all objects in the view into faint indeterminate shadows. The steaming rain has changed everything, and made it sharply and harshly defined and precise.

Still more, torn, pulled down, exhausted, and spiritless, are the bourgeoisie of the mountain vegetation,—all those companionable round tables of the forest fern, the blooming, burning red lights of the epilobium, the hieraciæ

which seem to be peering so curiously forwards, and all those forms "woven of vapour and light," which revel in a blooming summer life. It is as if a mischievous boy had been waging war against the plants; only the sappy stalks of the orchideæ grow fat in the overflow, and those squires of the vegetable world, that warrior troop, armed with arrow and lance against all offence—the sharp-spiked family of thistles—in spite of the beating storms of water, set up their sharp angles and spikes in heroic resistance. They are the same old champions, who, in the winter storms, when the weak soft cellular tissue of nearly all the other phanerogams gives way to decay, still stand up, although marrowless, like sentinels frozen at their post, and with the pale naked husks of their flowers still look forth through the universal sleep of nature, till the north wind, or the weight of the snow piled upon them, breaks them down too, and adds them to the crowd of the slain. Their motto should be "True till death."

And now, at last, the proletariat of vegetation, the common people of the creeping grasses, the aggregate of which forms the rich pasturage, the broad shield-leaved fescules, the airy copper-coloured bent, the plummy calemagrostes, the fat-leaved millets with their lofty umbels, the tender hairgrass and tough poaceæ, all lie completely prostrate. Their elastic power of resistance, the muscular power of their thin blades, is broken. As if they had been smoothly combed down by the incessant rain, they cling slavishly to the ground. A universal drunkenness seems to prevail in the world of plants, and the rain has shown that he is their master. For the quantity of rain on the mountains is something quite different from what it is on the level plains. Whilst the high level plains of southern Germany have a yearly rainfall of from twenty-four to twenty-five inches, and the

low level plains of the north some twenty-two inches, this amount rises in the deep Alpine valleys to fifty-four inches, and on the St. Bernard, according to an average of seven years, to seventy-three inches.

But all this is not enough by itself to mark the peculiar character of lasting wet weather in the mountains. Something like it may be seen after steady rains in the low country. What gives a much more dismal character to the whole phenomenon is the profound melancholy in which the whole landscape is sunk. The high peaks are invisible; clouds have hung their grey mourning cloak upon their shoulders. Although, even under a clear smiling sky, only a much smaller extent of horizon can be visible in the mountain-valley than from the boundless plains, during bad weather the mountains cut off the admittance of even this particle of clear day. The rain-clouds are perhaps not nearer to the earth than elsewhere; but, as the neighbouring masses of rock give a measure for estimating the height of the clouds, the whole atmosphere has the appearance of brooding like an evil dream over the landscape. It is not rare for strangers in such weather to be attacked by anxiety and foreboding as if some awful misfortune were impending over them.

The valley of Goldau was in this condition, when unexpectedly, in the forenoon of the 2nd of September, the rain ceased, whilst the melancholy horizon remained monotonously clouded. In the early morning the country people on the Gnypenberg (the eastern part of the Rossberg) and on the Spitzenbühl remarked fresh yawning cliffs in the soil and on the walls of rock. The sods of turf were in many places pushed over each other; and in the neighbouring forests a dull sound like that of file-firing was heard from time to time, as though the roots were being forcibly torn asunder. At the same time a

shower of nagelfluh pebbles came down from the cliffs over the "Gemeinde-Märcht;" but as such showers often take place when the snow melts in spring and at all seasons after continuous rain, and the inhabitants of the Röthenberg had long been accustomed to such noises and fallings, little attention was paid this time to these warnings; and the worst that was anticipated was that in some remote and already desolate place a "Brüche" or landslip might take place. This falling of fragments of rock with the ascent of clouds of dust increased meanwhile from hour to hour. The air trembled with constant oscillations, and the inhabitants of the Rossberg began to feel the shaking of the ground over a wide area. People who were busied in digging potatoes, hewing wood, or tending cattle on the neighbouring heights, looked towards the Rossberg with increasing alarm.

Late in the afternoon (it had struck a quarter to five on the church clock at Arth), suddenly, a vast chasm opened half way up the gentle slopes of the mountain in the "Rüthe" meadow which grew visibly broader, deeper, and longer. The surrounding turf turned over, so that it showed the red soil as if it had been ploughed. At the same time the pine forests on the same level became unnaturally animated. At first the tall slender pine trunks waved gently to and fro as if touched by an invisible hand, much as in summer the wind produces waves in the half ripe corn. This wave-like motion increased, but in opposing lines, so that the stems and tree-tops struck against and through each other with an irregular and vehement motion. With harsh cries, ravens, crows, jays, and other birds that harboured in the woods, flew upwards, and hastened in flying swarms in a south-westerly direction to the forests on the slopes of the Rigi. Now the vibrating and jerking motion, the wave-like rising and falling passed

on to the grass-covered land. It looked as if gigantic moles were burrowing under it. At the same time a gentle sliding and slipping of the whole upper slopes commenced, and became constantly plainer and more rapid. The pine forests struggled to follow the hurried motion, and looked — according to the expression of people who watched the whole terrible phenomenon from beginning to end — something like hair stroked against the grain.

These alarming phenomena steadily increased. In ever larger circles, and throughout a greater extent, meadows and grasslands, orchards, houses and stables with men and cattle were drawn along into the fearful descent. The people who saw the ground on which they had been born and grown up, give way under their feet, started up in horror and fled from their homes. Then was heard a thundering roar, as if the old foundations of the earth's crust had given way, a sharp crackling as if a thousand-pointed sheaf of lightnings from the threatening clouds had struck the supporting pillars of the earth with one blow, and burst and ruined the framework of the hills. The Steinberg-cliff, a rocky wall of several millions of cubic fathoms with all the forest upon it, and the nagelfluh wall of the "Gemeinde-Märcht" sinking like a terrace more than a hundred feet below, had given way. This was the signal for universal destruction, for then began a tragedy which can be compared to no other phenomenon for its fearful sublimity. In the wildest confusion blocks of rock and splinters of stone, mud and turf, foliage and trees, sometimes whirled up into the air, sometimes enveloped in clouds of dust, chased each over the mountain shoulders to the valley of Goldau. One huge fragment seemed to be trying to overtake another; it was a race of raw materials. The chaotic fall of the vast masses, the speed of their descent, the universal confusion, increased every

moment. Mountain-blocks as big as houses with pines fixed to them, hurried, as if slung by a demon's fist, with free bounds like flying birds, high through the air. Other masses of rock ricocheted like shots from a giant cannonade striking from time to time only to bound up again into the air. Others were crushed by their companions on their path, and spluttered like white-hot iron rods shooting out sparks under the hammer. It was a scene from the Titans' battle of Greek mythology.

In a few minutes hundreds of dwelling-houses, and as many stables and sheds were destroyed. For the whole slope of the Rossberg, almost up to the Gnypenspitze, whose highest point is adorned by a wooden cross, was at that time dotted over with detached houses; and beneath in the valley, between the lakes of Zug and Lowertz, lay the rich villages of Goldau, Busingen, and Lowertz. Under the ruins four hundred and fifty-seven men found a common grave.

There were strange stories of escape in this awful catastrophe. In almost the highest house below the Spitz-enbühl lived at that time Blässi Mettler with his young wife Agatha, nineteen years old. At sight of this infernal spectacle on the "Gemeinde-Märcht" the mountain peasant, fully believing in ghosts and witches, thought that evil spirits were at work. He fancied that the shrieks of the wood-owls were the exulting yells of demons, that the whistling and roaring in the rock-clefts were the mournful cries of damned spirits intended to give him warning, and that the thundering descent of the mountain was the work of Satan or the forerunner of the day of judgment. Brought up as he was in superstitious beliefs from his youth, crammed full of legends of treasure-spirits, hobgoblins and dwarfs, living in solitude apart from all society, his imagination painted the strangest pictures. To save himself, his wife and children from the attacks of the

fiend, he ran at full speed to the house of the priest at Arth, and begged him with tears and sobs to come and bless his house, *i. e.* to exorcise the evil spirits. Whilst he was still lamenting and telling his story, the catastrophe took place. Mettler out of his senses, drew off his shoes and ran like one possessed to his house, more than an hour distant. The doubt whether his beloved wife and his child, four weeks old, had become the victims of the landslip, nearly upset his understanding. Meanwhile, how had things gone on above? The poor young wife, in terrible anxiety at the awful and constantly increasing noise, and the almost uninterrupted shattering of the hut, passed hours of unspeakable anguish during her husband's absence. The time came at which, according to the country-custom, she used to boil porridge for her child. She had already mixed the milk and meal and lighted the fire on the hearth to begin cooking, when the thunderlike roar and the rocking of the foundation-walls of the house startled her. Undecided whether to go or stay, she ran into the room determining to escape into the open air with her child if it was awake, if not, to remain where she was. The child was awake in its cradle and not crying. She hastily snatched it up, took her husband's small property out of the "Gänterli" (cupboard), and hastened over the threshold, where the ground seemed to have become alive beneath her feet. She had scarcely reached the stable belonging to the house and turned breathlessly round for a moment, when the dwelling house which she had just left, dashed in ruins down to the depths below and a raging sea of desolation hurried past her stupefied sight. So Blässi found her as he hurried up, streaming with sweat. The poor man without thinking of the entire loss of all his property, thanked God for saving his family.

Some five hundred feet below lived his brother Bastian,

who at the time of the landslip was with his cattle on the common meadow on the Rigi. His wife with two small children was in the house when it was swept away by the fall. When the catastrophe was past and people crept shyly back to its theatre, the parents and family of Mettler's wife hastened up, to see what had happened to her and her children. Not a trace of the house was to be seen. All lay in the vast grave of ruins. Only some distance from the place where the house had stood, in the midst of the mass of mud, lay a mattress stuffed with withered beech leaves, and sleeping on it, lay the smallest child in its shirt. The uncle climbed down at the risk of his life, through the yielding avalanche of slime mixed with blocks of stone, and saved the little sleeper. A little mud had been splashed over his face, but he was otherwise quite uninjured. What wonderful accident had saved the child in the midst of a thousand deaths,—how the ruins of the falling house and the heavy roof-beams could have fallen without touching the child, while it was borne, as if by invisible hands, upon the mattress on which it was sleeping before the catastrophe and laid upon the heaps of ruin, is perfectly inexplicable. This child is now a man of fifty-eight, Sebastian Meinrad Mettler, who lives below in Goldau.

The most wonderful of the numerous escapes occurred in Busingen, near the Lake of Lowertz. There dwelt Joseph Lienhard Wiget, a strong hearty man of thirty-two, with wife and five children, in a handsome peasant's house "zurn unteren Lindenmoöss." He was a happy contented man. When the landslip began, Wiget was employed with his family picking up fruit in his orchard which had been beaten down by wind and rain. When he saw the mountain coming down, with great presence of mind he seized his two eldest children, and ran with them to

one of the heights opposite the Rossberg, whilst he called hastily to his wife to follow with the smaller children. The mother, who would not abandon a child eleven months old then sleeping in the house, rushed back into the dwelling. The maid Francisca with little Marianne, five years old, followed through the other door. As they entered the room all became dark; utter night enveloped the shattered house, and the unfortunates were buried alive. Francisca felt herself swayed to and fro, thrown down, and at last felt as if she was falling into an endless abyss; she lost her senses. When she came to herself, she could not move or stir, and felt that she was immured head downwards in cold wet mud. Only her face was free, so that she could breathe. Then she thought the end of the world was come, everything living destroyed, and she left alone in her grave in the middle of the terrestrial ball, the only being still alive. Thus, praying in deadly anguish, she heard a weeping voice, whose mourning constantly grew louder. She called out, and perceived by the answer that it was the little Marianne who was groaning. Spite of her awful position, she still feels delighted that a living being and one that she loves is near her. They begin to converse and compare their position. Marianne tells her that she is lying between beams and straw, on her back, and cannot move, but that she can see something green through a narrow strip of darkness. The pious Francisca thinks it is a look into Paradise. A long time passes amongst prayers, sighs, lamentations, and weeping. Then both hear the sound of a bell. It is the pleasant evening sound of the "Betglocke" (curfew) from the Steinberg, which sounds at eight. Now Francisca is convinced that the world's end is not yet come, and a slight hope of safety dawns upon her. Both cry for help, they shriek, but in vain. Now the appalling thought "buried alive" rises for the first time in Francisca's mind.

But she must fight against it and conceal it from the poor child, not to increase her anguish. They hear the later "night-bell" in Steinen, and again pray uninterruptedly an hour long; but no hope of safety appears. Now too the child feels torturing pains in her body and the pangs of gnawing hunger; Francisca is fainting from the pain of only being able to give her favourite words of comfort instead of real food and help. She cheers her up by all sorts of anticipations (in which she does not herself believe) to make her content, and tries in every way to soothe the poor sufferer. The child's complaints become steadily more weak, broken, inarticulate—at last they quite cease. "Thank God, it is over!" sighed the faithful maiden, and prepared for her own death; for the hours of suffering began to be unbearable, and a deadly chill, with feverish changes, passed through bone and marrow. After terribly tiresome, long efforts, she succeeds at last in freeing her feet partly from the solid mud surrounding them, so that she could move them and produce some circulation of the blood. All the rest of her body remained immured as before. Words cannot describe the terrible torture of such a position.

At last the whole long night was passed in this death-like waiting. The morning bell sounds on the Steinberg and then also at Steinen. It rings back hope into her almost broken heart. Again, prayers rise from her compressed lips, and like a ray of the rising sun, the confident conviction arises in her that she will be saved. Then, wonderful to say, the voice of the child she had thought dead sounds again. A swoon-like sleep had shortened the night for her. She complained again of hunger, and violent pain, and called to Francisca to help her.

At break of day, the comfortless father and husband had hastened to the scene of horror with his two boys,

where he had already worked the evening before, to find, if possible, the corpses of his beloved family. The past night had been the most painful of his life. A beggar without a roof, the poor man who just before had been well off, had to beg the compassion of other men on himself and his two children. So at daybreak he began his search anew, with his friends. After an hour's work he at last sees a foot, then clothes. It is his wife! With hasty care, he works on, straining his great strength to the utmost, throwing aside huge masses, and at last clears the whole body from the earth. There his dead wife lies crushed, a victim to maternal love and faith, her two children pressed to her heart. He throws himself down with a loud cry on this beloved corpse and fills the air with his lamentations. But, by a marvellous accident, this cry of grief penetrates into the graves of those who were buried alive. Both call for help, and those standing above hear it. Marianne is found first, after a long search, freed, and drawn out. The child's ankle-bone was broken. Afterwards they found the maid. Both recovered. They had been buried alive full fourteen hours in suffering and despair.

Most of those entombed must have died a sudden death, and been crushed at once. But how many may, like the rescued Francisca, have waited on for days, below the masses of mud and slime, with broken limbs, and hoped for an escape, to die, at last, the painful death of hunger.

The number of those who were saved directly by help, or indirectly by flight, or absence from home, was about half (220) of those who were killed.

Terrible and really tragic was the fate of a party of travellers who were about to ascend the Rigi, in hopes of an improvement in the weather. It consisted of members of old, noble families,—Herr von Diesbach and his wife,

Frl. von Diesbach, Colonel V. von Steiger, the brothers May, Jenner von Prestenberg, some boys and their tutor, a Herr Jahn of Gotha. Late in the afternoon they had left Arth, and were going on foot to Schwyz, having given up the ascent of the Rigi. Herr von Diesbach, the brothers May, and the tutor, were some hundred paces behind the rest of the party, and saw them enter Goldau laughing and chatting. The others were just about to follow them into the doomed village, when the thunder of the fall startled them. They looked up, saw the masses in wild motion, rushing to the valley, and hurried back along the road, in confidence that their friends would do the same. Close to the spot where they stopped in exhaustion, a hail storm of stones and rock-fragments rattled down. When the uproar was stilled, they hastened on to the buried village. As far as they could see there was nothing but desolation,—walls of mud, and a waste chaos: without sign, or the slightest indication of the only too certain fate of their friends and companions. The pain of the survivors and their lamentations at their loss are said to have been heartrending. The ruined field of Goldau is still visited by all travellers on the Rigi and Lake of Lucerne.

For several decades of years the whole country in which Goldau formerly lay looked desolate, in strange ruin, like a place blasted by a curse. Fragments of rock reminded travellers at every step of the 2nd September 1806. Time has softened, and the beautifying hand of vegetation has somewhat wiped out those mournful memorials. Those rocky ruins are clothed with moss and saxifrages; violet coloured campanulas grow merrily and fragrant, white clover grows out from the débris, between the meadow grasses and thistles. Thickets of bushes and groves of fir overshadow the blocks of stone; and when coming generations begin a new century, only vague outlines will indicate the vast grave.

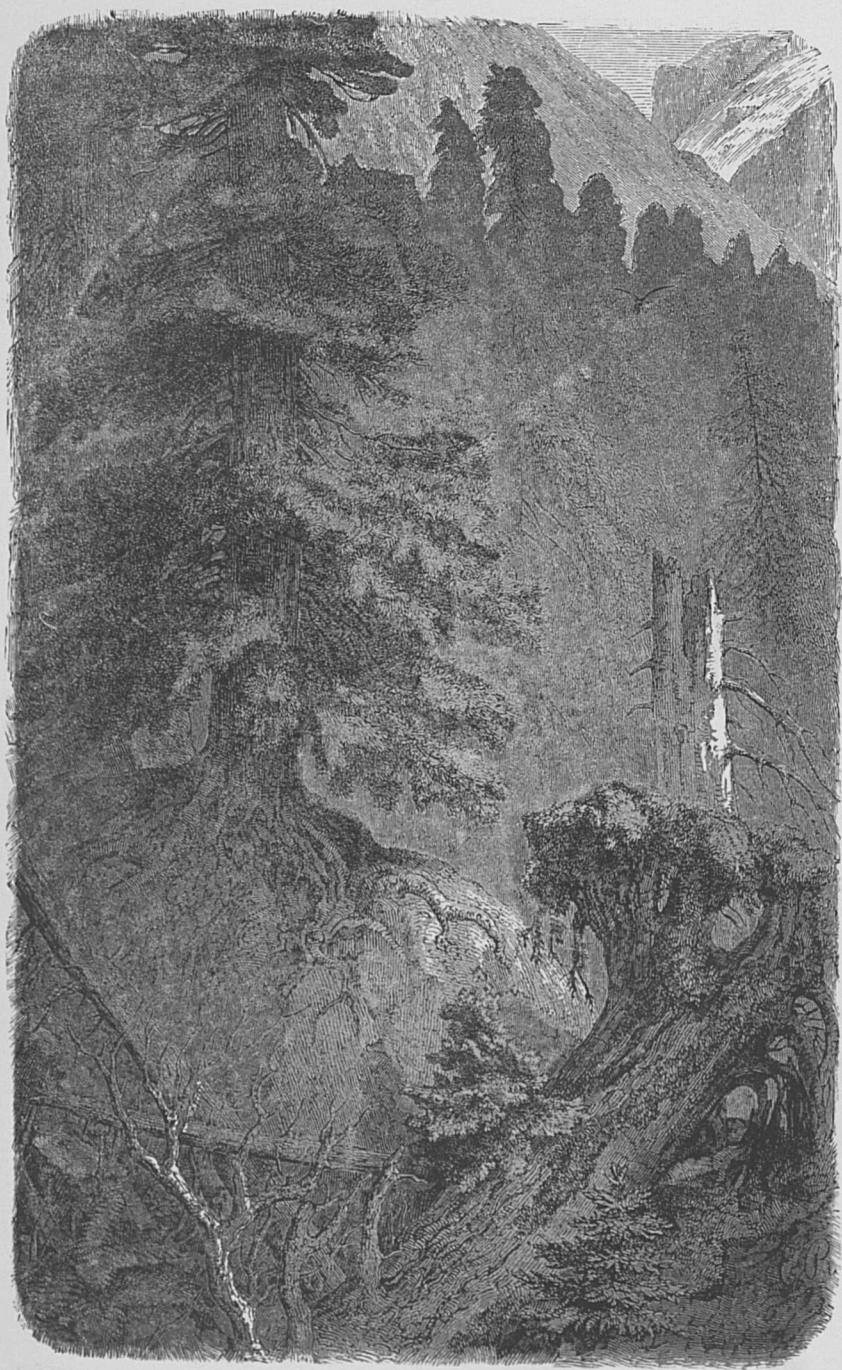
CHAP. VII.

THE BAN-FORESTS.

NOTHING can be in fuller harmony with the quiet sublimity of the central Alps than the primeval mountain-forest. The idea of sensitive dreamy plant-life finds there its fullest expression. There too we can meet the full free operation of nature in deep strongly marked features. The garden-tree of the lowlands, well cared for, and regularly nursed and educated, looks feeble as opposed to the patriarchal dignity and reverend solemnity of the Alpine "Ban"-forest. Their relation is that of the practical modern time to the rough, strong, romantic middle-age. For, in fact, the primeval forest of the Alps comes down to our days as a fragment of past times; and many of the trees, centuries old, were once witnesses of great deeds ennobled in legend.

The name "primeval forest" has been so associated with descriptions in foreign books of travel, that our fancy involuntarily springs, in thought, across the ocean in search of it. The only comparison with the primeval forests of America lies in this, that it points to the maiden state of the Alpine forests still untouched by the cultivating hand of man. In all other relations the names apply to the most different objects.

The primeval forest of the tropics shows an immeasurable wealth of vegetable forms in the most fiery and



THE "BAN" FOREST.



splendid colours ; such an inexhaustible number of individual plants that a very small area offers to natural philosophers materials for discovery, employment, and study for a long period. The Alpine forest, on the contrary, is monotonous and unpretentious. Few types of plants in proportion form the elements of which it is composed ; and these again in their normal shapes offer nothing strange or startling. Still less is the Alpine forest clothed with attractive splendour of colour. A dark sober hue is spread all over it, and only broken melancholy tints intrude shyly into its depths. If we compare again their quantity of life, the American forest presents a complete picture of the most wanton, indestructible, victorious life, an ennobling of the vegetable power of reproduction. It is an uninterrupted jubilee of resurrection—the everlasting Easter in the kingdom of plants—everywhere the process of dissolution is concealed under the rich luxurious foliage of the young shining aftergrowth, and the happiness of eternal youth seems to prevail. The Alpine forest is a quiet field of the dead ; one of those melancholy dark places of natural corruption, where life and destruction come into immediate contact and reciprocal action. In dull melancholy, the rough dark green pines and slender larches stand round the mouldering corpses of their forefathers. The luxuriant fungus parasitically sucks and drinks life and nourishment from the skeleton of its dead stem. And finally, if we oppose the animal-life—the screaming, flickering, crying, roaring, animal-life—of the American forests to the monstrous waste and dismal stillness of the Alpine mountain-wood, how sharp is the contrast ? There is heard the tumultuous noise of quarrelling parrots, accompanied by the strange shrill screams of roaming mischievous monkeys, the mingled harmony of the cicadæ, who carry on a mighty concert in

the Brazilian forests ; and between these, a fluttering life of numberless dragonflies, and insects, shining like metals, who are humming through the air like glittering jewels, the rustling of crawling snakes and vipers, and the fearful howling tones of a crowd of unseen beasts from the interior of the monstrous labyrinth of plants ; whilst the high Alpine forest, resounds at most to the hollow hammering taps of the woodpecker, or from the upper air the silence is broken by the long-drawn piping cry of eagle or vulture. Dead nature only wakes at times, and joins the harmony with a tone of thunder, when the elements are in strife ; the forest brooks rush out foaming, and lash waves over rock-fragments ; or the avalanches thunder down the slopes, and the storm whistles through the tree tops.

Dark and poor, limited and rough as the Alpine forest appears, when opposed to his foster brother across the sea, his depths conceal wondrous secret properties and strange wild charms.

Every ban-forest is not a primeval forest. There are, properly speaking, but few of them left. They are only to be found in the rarely populated and densely wooded cantons of the Valais and the Grisons ; and even there only in the territory of those communes which have had a superabundance of wood, or whose forests lie in part so deeply sunk in inaccessible mountains, that the expense of transporting the wood when cut down would eat up the profit derivable from its actual market value. This is the case, for example, in the ancient forest lands of the Lower Engadine, in the Val Sampuoir, in the Schergenthal, under Piz Mondin, in the Lischana Tobel, on the Piz St. Ton, in several parts of the Scarl-thal, in the Val Zeznina, in the forests in the Unina Thal, and remarkably in the great Dubenwald of the Turtman-thal.

Every mountain village, however, has ban-forests, if it is shut in by steep valley walls, and therefore exposed to avalanches, falls of stones, or landslips. These ban-forests are kept up from motives of prudence, not from neglect of the forests on account of superabundance of wood. There are communes which from bad management of their forests are deficient in firewood, and have to buy it and bring it long distances from other common forests, while at the same time they have great bann-woods immediately over them, which they do not allow to be cut down. An example of this is Andermatt, in the Urserenthal, with the St. Annawald above it.

The office of the ban-forest is to hinder by its mass of strong upright stems, the breaking loose and sliding down of the vast heaps of snow that accumulate in the winter, and thus to prevent the formation of "ground avalanches," not, as is commonly supposed, to hold up avalanches already started, like a dam. Such a forest would only be a protection against these last for a few years; in every spring the upper borders of the forest would be severely injured by the abrupt descent of the avalanches (which as has been said, have regular outlets, or avalanche-runs), and the foremost ranks of trees would be cut down like stalks of straw. In a few decades of years a desolate heap of fragments of trees and rocks would appear, instead of the protecting forest. The inhabitants of the Alps saw this necessity centuries ago, and therefore spared particular forests, placing them under the "ban," *i. e.* declaring it unlawful to touch them. And as in earlier times the transgression of a law was clothed with strange, mystic wonders, closely connected with the popular superstition, which were supposed to be impending over the criminal from the unseen powers, the trees of the ban-forests were considered sacred. Schiller has brought

this into Wilhelm Tell (Act iii. sc. 3.). The boy Walther asks —

Walther.—Vater, ist's wahr, dass auf dem Berge dort
Die Bäume bluten, wenn man einen Streich
D'rauf führte mit der Axt? —

Tell.—Wer sagt das, Knabe?

Walther.—Der Meister Hirt erzählt's — die Bäume seien
Gebannt, sagt er, und wer sie schädigt
Dem wachse seine Hand heraus zum Grabe.

Tell.—Die Bäume sind gebannt — das ist die Wahrheit,
— Siehst Du die Firnen dort — die weissen Hörner,
Die hoch bis in den Himmel sich verlieren?

Walther.—Das sind die Gletscher, die des Nachts so donnern,
Und uns die Schlag-lawinen niedersenden.

Tell.—So ist's, und die Lawinen hätten längst
Den Flecken Altdorf unter ihrer Last
Verschüttel, wenn der Wald dort oben nicht
Als eine Landwehr sich dagegen stellte.*

The belief in the existence of bleeding trees was spread widely in the middle ages. The “blood-linden,” on Burg Freienstein, near Wiesbaden, is said to have derived its name from this; the holy oak at Romove bled when the Prussian knights felled it. So too bled the well-known

* *Walther.*—Father, is it true that up on the mountains there, the trees bleed if they are struck by an axe?

Tell.—Who says so, boy?

Walther.—The master herdsman says so. The trees, he says, are cursed, and if any one hurts them his hand will grow out in his grave [*i. e.* his hand will grow out to be gnawed by dogs, a proverbial judgment on impiety].

Tell.—The trees are banned—that is true. Do you see the snows, the lofty white horns, which lose themselves high up in heaven?

Walther.—Those are the glaciers which thunder so at night and send us down the avalanches.

Tell.—True; and avalanches would have long ago overwhelmed Altdorf, if the forest up there did not hold them back like a guard.

pear-tree in the forest near Lupfig (canton Aargau), and many such stories are to be found in northern legends.

The science of cultivating the forests, which may almost be said to have had no existence in the cantons of the High Alps, could not produce a rational treatment of the ban-forests. These were, and, in part, are still, specimens of the most senseless injurious conservation. From the intention that no trees should be felled, trees centuries in age were allowed to become tottering; these fell over, and not only injured in their fall the young strong trees near them, but destroyed them indirectly by tearing up their roots in a mass from the earth, and with them the generally thin layer of soil from the rocks. Or where the wind had blown down part of the forest, those who belonged to the commune took away what they wanted at the moment, leaving the remainder lying, by which it is clear that the young powerful aftergrowth was much hindered. Thus many ban-forests, especially in the original cantons and in Tessin, the Valais, and the Grisons, look awfully wild and ruined. A journey through such a forest will make us more nearly acquainted with its characteristic properties.

All ban-forests consist almost entirely of "needle" wood, especially of pines or "Ziebel Kiefern" (*pinus cembra*) and larches (*pinus larix*), which predominate in the Eastern Alps, and rise in close masses to a height of 6000 feet above the sea—and of red "roth-tannen," or firs (*pinus abies*), and "Kiefern" (*pinus sylvestris*) called also "Dähle," which form a larger part of the western forests, and whose boundary is at 5500 feet above the sea. The wood of the Alpine trees, which has grown much more slowly under the hindering climatic influence of long winters, is far tougher, harder, and firmer, showing narrower yearly rings than that of the

quick-growing forests of the hill country or lowlands, with their roots in richer soil. Therefore not only does the tree of the Alpine forest have a far rougher appearance at an age when, in the lowlands, it is looked upon as already grown up ready for felling, but its growth is also more repressed, more self-willed and stubborn, although, when it has arrived at its growth of many centuries, it is not shorter on that account than the pines and larches of the lowlands. Very little of the "leafwood" occurs in the high forest-lands. The only trees which are extended to some degree here and there are the mountain sycamore (*Acer pseudo plantanus*) and the white-stemmed birch (*Betula alba*), which grow up to 5000 feet. Farther up above these limits, the forest ceases; the trees stand no longer in continuous ranks; they are in scattered groups, and at length pass into dwarf forms, or the so-called "knee-timber."

The life of the smallest and lowest vegetable organisms of the "leaf" and "liver" mosses, and of the lichens, is most strongly developed in these woods. Rich fields of discovery are open to the lovers of mosses on the granite backbone and watersheds of the Alpine chain. People have scarcely a right conception of the luxuriant fullness of the cushion, often swelling a foot in height, which the mosses form on the ground over considerable tracts. They clothe, creep, and spin their webs over everything, with their charming and endlessly varied forms. They are the soothing, harmonising, reconciling element of the vegetable world in these gloomy tree-labyrinths, under whose soft embrace the ruins are withdrawn from the eye and submerged. What the hot steaming layer of leaves concealing snakes and dangerous vermin is for the tropical woods, these mossy pillows are for the Alpine forest. Although the viper's brood, so threatening to the investi-

gating traveller, does not nestle in them, they are not less dangerous for him who will clamber through an ancient ban-forest; because no safe step can be found in their strangely elastic mass, and the foot treading between hidden stones may easily be twisted, and sprains be incurred.

The largest space is occupied by the feather mosses, or Hypnaceæ, amongst which *Hypnum triquetrum* and *splendens*, which are also common in the German forests, are the best known. Besides these two kinds the Alpine forests are full of *H. molluscum*, the bright green shining *H. denticulatum* and *sylvaticum*, the brown-yellow *H. tamariscinum*, the juicy, damp, long trailing *H. purum*, and the strangely beautiful *H. striatum*, with its tender green feelers, and its cornlike seed-capsules peering curiously forth in their thin stalks from its velvet surface. The mosses are almost as common, especially the rich stalked "gobelzahn" (*Dicranum scoparium*), a bright sap-green, with a lustre-like satin forming soft pillows, and the wave-shaped *D. undulatum* with far more extensive ramifications. Between these are a crowd of lichens, amongst which the *Cetraria islandica*, or Iceland moss, and *C. cucullata*, stretch forth their coral-like arms most conspicuously.

Besides these thick beds of moss the knotty grey splintered pines, the resinous, sharp-neededled, slender larches, and red ochre firs look out, as it were, from warm winter furs. In the lighter places and open forest glades the grey-green bilberry bushes (*Vaccinium Myrtillus*), "Herrgotts süppli," or wood sorrel (*Oxalis acetosella*), the common spurge laurel (*Daphne mezereum*), the bullet-headed burdock (*Carduus personata*), the creeping snakelike earth-moss (*Lycopodium annotinum*), the boldly rising circles of fern, the *Aspidium lonchitis*, *lobatum*, *Cystopteris*

montana, and *Polypodium alpestre*, the white *Veratrum album*, and, in still more open places, the low creeping juniper (*Juniperus Rana*), the *Hypericum montanum*, the meadow rose (*Epilobium alpestre* and *Gesneri*), with its carmine-coloured coronals, the charming heathlike *Azalea procumbens* with its leathery leaves, and many other Alpine plants, have climbed up and predominate over the mosses.

We do not, however, leave the ban-forest for a long time yet. We press first into its still secret recesses. The way upwards, with the moss constantly more entangling to the feet and reaching to one's knees, becomes more difficult. Presently an uprooted mouldering stem stops all progress. It must be surmounted. A second and a third follow ; and higher up there is a whole mass forming a natural barricade. Like broken matches, the split grey-mouldering dead bones of the forest lie round.

“ In stiller Nacht, wenn Mond und Stern nicht glänzen,
Umquillt phosphorisch Licht den morschen Baum,
Wann ihn umwallt von seinen todten Herzen
Ein leuchtender und schöner Grabestraum.”* A. Grün.

It is the battle-field of an avalanche which the spring sends down as a thundering kiss to his children. Close by is the path which it followed. The old pale rotting stems which its embrace killed, mark the way down which the train of its snowy garment slid. What a picture of destruction ! What strange grotesque groups of splintered trees, rocky fragments heaped over each other, walls of débris piled up, heaps of earth entangled with fascines of bushes ! And how busily lichens, fungi, and mosses climb over the fallen trees, and eagerly suck out their last

* “ In the dark night, when moon and stars do not shine, phosphoric light spreads round the mouldering tree ; a dream of his dead springs plays round him, a fair and brightening dream in the grave.”

drops of life! *Orthotricum speciosum*, that lively yellow-green moss, which does not even spare the old fruit trees of the plains, creeps, in common with a mass of pale grey lichens, over the dead pine boughs. The *Georgia mnemosynum* with its wounded tendrils crawls over the stems. In the clefts and crannies bright green feather-mosses (*Hypnum pulchellum* and *serpens*) have nestled, bearing their tender purple-red seed stalks. In many places thread-mosses like *Bryum longicollum* and *capillare*, spreading themselves out in closely pressed tufts, surround broad yellow glistening levels. These are only a few of the parasites of beautiful forms and hues which charm the eye by the delicacy of their construction and their brilliancy. Between them crowd legions of ugly lichens, like the grey-green *Biatora icmadophila*, with its flesh-coloured capsules, the rare clear-brown *Sticta pulmonacea*, the dirty cinnabar-coloured *Lepra cinnabarina*, and the dusty *Lepra sulphurea*.

In these microscopic settlements of the vegetable world, lives and moves an insect population of spiders and ants, centipedes and mites, beetles, flies, and worms, in continual warfare, digging out holes in the corklike texture of the rotting wood, spinning nests between the branches of moss, intrenching themselves behind the lichens, lying in ambush for the spring, or caring with busy industry for the household wants of their tiny economy. What an infinitely rich world in miniature is enclosed here in the midst of the vast and deathlike solitude of the forest! How wide a field for the investigations of the natural inquirer is hidden in one mouldering tree-trunk with its visible and invisible inhabitants! A whole age of men would not be enough thoroughly to search out the mystery of the life of every one of these minute invisible animals, its origin and decay, the organisation of its body, and the functions of its members, its sleeping and waking,

its enjoyment and suffering, its wants, desires, and battles, its length of life, and its dependence on the universal laws of creation ; and again the reciprocal action of each upon all the others. The limits of our investigations are narrow. "Man is not born to solve the problem of the world, but to seek out whither the problem tends, and then to keep himself within the limits of the comprehensible."*

To press on through this plant-fortification of Nature is all but impossible. The uprooted, split, and broken stems lie round in hundreds, cast over and through each other, and ward off all approach by their naked outstretched boughs and their roots turned up to the clouds. Between them, however, springs up a strong young plantation of pines. Even out of the stumps of the prostrate forest-giant new life streams up, and strives to grow green and regenerate it. A few hundred paces off on one side there sinks a "tobel;" we can hear the dull roar of its glacier brook : there we shall get on a little better.

"Tobel," in the Swiss Alps, signifies one of those uninhabited little lateral valleys or gorges, shut in between high wooded or rocky mountains, whose bottom is occupied by a river-bed, so that the soil cannot be turned to account. Its walls are generally very steep, and the whole ends in wild untrodden woodland, or in a steeply rising "rüfe," *i. e.* gully, rising bare of all vegetation, and covered with ruins of rock towards the crest of the mountain. It is an ancient German word that is found in Notker's psalms. In Berne they are called "krachen," in the French mountains "gorge." In these desolate, strange gorges, the popular belief places the abode of evil spirits and spectral monsters. The dwellers of the neighbourhood of Bellinzona suppose the souls of misers, unjust guardians, and usurers to suffer in the Sementina tobel. At Leuk they ascribe the torrents of mud and desolation

* Goethe.

which burst out of the Illhornschlucht to accursed spirits banished thither. The people of Chur have many legends to tell of noisy demons, "heerdmandli" and "mooswybli," in the Skalära tobel. The so-called Enziloeh below the beautiful point of view in the Entlibuch is known to be exclusively the home of rich departed blood-suckers and oppressors of the poor. They are generally only called the "Thal-herren"—valley-masters; and when at night a storm is howling through the gorge, so that the pines creak, and blocks of rock rattle down into the depths, the people say, "a new valley-master is coming home." All the great Alpine valleys are rich in such "tobels," but especially the Grisons valleys, Prätigau, Davos, Schanfigg, the Lower Engadine, and the Vorder-Rheinthal, the Valais and Ticino. The footpath through them, when there is one, generally runs halfway up, in great curves, following the disposition of the ground, passing round secondary tobel-like openings, and only sinks in a steep rugged path, cut through by roots to the bottom of the gorge, where it is necessary to cut across the tobel.

Here too solitude has taken up its abode, though in very different guise. It is a thoroughly romantic wilderness, dreadful and yet pleasing, a theatre of the destruction that is always gnawing at the mass of the mountain, but of quite another kind from the rest. Varied groups, in all kinds of strange forms, of rolled granite blocks, polished tables of limestone, and smaller deposits of stones, are built up in the bed of the stream,—an ornamental fancy-work of nature, over which the crystal or clear green mountain-water splashes down in little cascades.

The pigmies of the plant world, mosses, lichens, and saxifrage, have here too nestled in the rocks. With hair-like roots they cling firmly to the pores of the

stone, and, boring deeper, squeeze industriously into it, surrounding every little elevation so tightly that it is hard to loosen these little self-willed things from their hold. The lichens stick in still more closely; they appear like a mineral growth out of the rock itself. They, however, all differ in kind from those that occur on mouldering trees. At one time it is the far-extended *Andræa rupestris* and the Alpine stone-moss (*A. alpina*) that clothes the rock with its bronzed and dirty-green covering; then the star-moss (*Mnium stellatum*) with its purple-red borders, and the twisted pearl-moss (*Weisia curvirostris*.) The tough vitality of these rock-plants is extraordinary. In hot summers, when the power of the sun strikes down most vehemently into these deeply sunk "tobels," the stone-mosses get not a drop of water for weeks. They can only draw new power of life from the nightly coolness. Where the brook-water sprinkles the walls of rock and keeps them constantly moist, the pale thread-moss (*Bryum pallens*) and the *Angstræmia virens*, *Bertramia ithyphylla* and *Æderi* occur in masses, covering the shady rocks as high as houses; and where the rocks are actually dripping with the water that runs down, the copper-brown club-moss (*Hypnum rufescens*) spreads its thick tough layers.

The shady path ascends along the tobel; we try a second excursion into the forest and penetrate into its pillared halls. This time it is no mossy ground upon which we are climbing up. The layers of centuries of pine needles are woven into an elastic carpet. The roof of thick boughs is so close that only a few rays of light from above penetrate into the deep night of the forest; and thus the moss cannot grow. But a new and strange phenomenon startles us. The grey-green bearded lichens (*Usnea barbata*) hang down in

long rough tufts from the withered boughs; not a thread of these lazy streamers moves in the calm mid-day heat, but if only a light breath of wind stirs in the forest, it swings and waves strangely through the deep twilight. All determined outlines disappear. The whole view passes into flickering motion, and "the ancients of the mountain" seem to gain life. In the Engadine pine forests a variety (*Usnea longissima*) occurs, which spins long streamers several yards in length. On the larches, on the contrary, grow especially the ochre-yellow riband lichens (*Evernia divaricata*), and mixed with them the mane-like moss-beard (*Bryopogon jubatus*), called also black bearded lichens (*Alectoria jubata*) because their extremely fine hairs, more than a yard long, have a deep brown colour.

The way upwards becomes difficult, for it is constantly steeper and more slippery on the needles. Blocks of stone which have been rolled down show themselves here and there like Druid altars. Their number increases, the forest grows lighter, the higher we ascend; and we soon stand on a picturesque chaos of ruins, half forest, half landslip, covered by a thickly folded mossy carpet. We now see the second use of the ban-forest, to be a defence against showers of stones. Upon the grey, weather-worn mountain-ridges of a stratified formation, are gathered broken flakes of rock, the same material that forms moraines on the glaciers and covers the mountain-shoulders. Part of these slide or roll far down the valley, and these constitute the "stone-falls." Many a frequented path on the mountains would be only passable at the risk of one's life, many a place be uninhabitable, if it were not protected by a ban-forest against this driving shower of stones. Thus the rocks are heaped up on the borders of the forest, and there

in time they themselves build up a protective dam. A solemn forest of this kind, with rocky ruins pierced through by innumerable roots, and admirable in a botanical and picturesque point of view, is the Wasen forest on the St. Gothard.

Finally, a third use of ban-forests is to keep off landslips. The deeply penetrating roots which generally pierce through the thin layer of soil into the crannies of the rocks, prevent the saturated earth from sliding after long-continued rains. The giving way of the rootwork in such places leaving the rock bare, has before now produced the most melancholy disasters. The village of Tschappina on the Heinzenberg in the valley of Domlesch, is at the present moment enveloped in such a slide. Every year the position and size of the plots of ground varies, so that the possessions of the villagers can no more be marked out in spite of measurements and boundary-stones. Whether a violent catastrophe will ever occur cannot be predicted. The people quietly inhabit the old piece of ground, and gradually slide with it to the valley. The same thing happened to the partly destroyed village of Buserein above Schiers in the Prätigau. There the land began to move, in consequence of the decay of a great forest; the turf turned over in folds, trees disappeared without a trace, and on the 18th of March, 1805, it ended in the falling in of half the village. All Alpine valleys have had more or less to suffer from landslips, especially the Swiss valleys, because the sovereign authority of the people in the free states thought that personal liberty was infringed by an official superintendence of the forests, and, therefore, in many cantons the benefit of a forest law came too late.

Such is an Alpine ban-forest. Let us now pass beyond them.



WETTERTANNE.

CHAP. VIII.

THE WETTERTANNE.

LIGHT and air! we are coming into open space. The higher boundary of the forest lies behind us. It reaches to 5000 or 5500 feet above the sea. Higher up the mountains are only fresh green Alpine pasturages, with short close turf, interrupted occasionally by scattered belts of wood and single pines and larches. These stretch like a line of skirmishers before the snow region, as though to defend the rights of the plant world against the enemy of all life. To these bold outposts of the forest belongs especially the "Wettertanne," or weather pine.

People talk of the characteristic trees, which give the landscape their peculiar expression and physiognomy. Such a tree is the Wettertanne: it is a character too amongst trees, and seems to have a certain personal importance, an individuality prominent amongst the others. As a single burgher, in his narrow circle, only forms a part of the great whole—the state—and disappears in the population, just so the single tree disappears in the forest: it only counts as a single stem, and disappears at a short distance in the vast green leafy vault, in the intertwined and inarched system of boughs.

Very different is the solitary Wettertanne as it towers above the forest, like the heroes who by their spirit and power, by bold works and free deeds, strike up above

the crowd of their companions ; and what the poet sings of the really great princes,—

“ Völker verrauschen ;
 Namen verklingen ;
 Finstere Vergessenheit
 Breitet die dunkel nachtenden Schwingen
 Ueber ganze Geschlechter aus.
 Aber der Fürsten einsamer Häupter
 Glänzen erhellet,
 Und Aurora berührt sie
 Mit den ewigen Strahlen,
 Als die ragenden Gipfel der Welt,” *—

may also be in part applied to the *Wettertanne*.

There are few other trees which bear such free fresh courage in their appearance, and stand up in such proud stern obstinacy, in such calm self-confidence, as those weather-beaten highland pines. If the oak reminds one of those iron northern knights of whom the *Nibelungen* and the singers of the middle age tell us wondrous stories, the stiff courageous attitude of the “*Schirmtanne*” (shelter-pines) may recall the battles of *Morgarten* and *Sempach*. It is a mountain tree from the lowest fibre of its roots to the highest crowning sprout. Many a clever botanist, who has wandered over the wavelike hills of the noble state-forests, has, on his first visit to the Alps, stood in astonishment for the first moment, and not known how to catalogue this strange tree. For the proper type of pine has frequently quite disappeared in it, when it rises, *can-delabrum-like*, with branches bent upwards, as though it were a hybrid between a fir and an American agave. And yet no drop of such tropical sap circulates in its

* Nations vanish ; names cease to sound ; dark oblivion spreads its broad pinions of night over whole races. But the lonely heads of princes shine in splendour, and Aurora touches them with eternal rays as the towering summits of the world.

veins, but pure, unadulterated, hearty pine-blood, sound, nourished by eternal snow. This "Schermtaxe" (as they are called in the Austrian Alps) is nothing more or less than a plain genuine pine, such as those of which millions are yearly felled below by the woodmen, and brought to market for fuel and building materials. But the Wettertanne has had to go through a different school of life from those educated weaklings, the slender maiden-like trees of the lowland forests: it has had to fight its way up, inch by inch; and hence its frequently abnormal growth, and scars in bark and timber.

The Wettertanne, which rises in isolated positions on the Alpine meadows at heights of 6000, and in the Grisons of 7000 feet, is not a surviving remnant of former tree-armies in this highest zone of tree-growth—it is a hermit grown up by itself. Centuries ago there were great forests up there. Huge stumps of roots and sunken stems indicate their former existence; such tree-spectres of a past generation are to be met nearly everywhere in the high mountains, telling of the time when there were still noble high forests, before sovereign stupidity and mercantile speculation undertook their barbarous struggle in the Alpine world. These storm-broken silver-grey memorials are the exclusive possession of the high mountains, and indeed of the *free* mountains, into which the hand of the forester (necessary in the valley forest) with his censor's axe, and all the regulations of the modern state, have not yet penetrated. Rational management would not endure such relics in a well-ordered forest household—they would be contrary to orders. Below, in the land of principles, Nature must produce by order and article, by rule and measure, for time and need, as the material wants of men require. Up here in the mountains, the unrestrained, full, free out-pouring of the inexhaustible power of creation still rules,

and to this the boundary posts of the Wettertanne owe their existence.

A Wettertanne (called "pins" or "sapins" in the Romansch, "gogant" in the Pays de Vaud) is therefore a solitary tree on an Alpine pasturage, which, as implied by its name, has a thoroughly weathered appearance. It is generally a pine, whose heavy and far-extended branches begin a few feet above the ground, and in the normal shape; the form is repeated by the young branches up to the top, forming a thickly wooded and sheltering roof. Often, however, it is a form which sets at defiance all common laws of growth. Our picture shows the abnormal ramification of such a tree. Whilst the lowland tree shoots out its horizontal boughs almost architecturally in pyramidal symmetry round its slender column, and each of them again in its elastic line, and in its delicately bent flat arc, may be called a model of elegant growth, the Wettertanne shows in its summit and in its arrangement of boughs an entirely new shape. It does not look like one tree: it seems to be six or eight trees round one maternal stem—a whole family of pines. Here the straight coquettish shaft has been metamorphosed into a rough knotted cylinder of compressed and deeply marked growth. Its noble striving after its law of vertical growth may still be traced, but its unfavourable outward circumstances, storms, avalanches, and thunder-storms, have so knocked it about, broken it off short, and amputated its limbs, that it is covered over and over with rents and deeply scarred wounds, full of knots and malformations. The Wettertanne might be called a martyr of trees, if it had more of the passive element in it. But this tree is a cross-grained fellow; there is none like him: he shoves his head viciously through every hindrance and chicanery, and though wounded a hundred times in his innermost life-nerves, stricken almost to death,

still he fights his way up with irresistible power of vitality,—a noble fellow, full to the brim of energy, manly and inflexible, a character in whom every honourable man must take pleasure.

And then the boughs, they have the same active nature, the same push at all hazards as the stem. Every little twig stands up for his independent rights, and will be a bit of a tree on his own account. It is an illustration of the proverb, “Wie die alten sungen, so zwitschern die jungen”—as the old ones sung, still twitter the young. Quite unlike the horizontal boughs of the lowland pine, these boughs after a short level shoot outwards, turn like a swan's neck upwards, and grow vertically like a little pine, with its roots in the air. But the boughs do not stand equally all round the stem, but on one side where the lightning has scored and crashed, or the storm cut out the limbs, they are wanting, whilst on the opposite side boughs and leaves grow more intensely and more closely packed. Here and there withered dead stumps of boughs strike out, and help, with the long beardlike lichens, to give a wilder expression to the whole picture. The cause of these strange branchings is to be sought for in many circumstances. Perhaps the so-called “trockness” (dryness) has struck them, a disease of trees which withers the actual points of the boughs, so that the power of propulsion goes into the lateral branches, and one of them is so developed as to overtake the others, and, being hindered by his neighbours, strikes straight up like a torch; or the goats, in their passionate eagerness for gnawing, bite off the outside shoots as far as they can reach up the young tree, and the bough, cut off in its natural direction of growth, takes another way upwards; or snow and storm twist the ends of the branches, or the lightning strikes them off;—anyhow, robbery and breakage are the causes not only of the abnormally shaped

branches, but of the thick bushy foliage. Below, in sheltered forests, such misshapen weather-beaten pines are not to be found.

A colossal specimen, three-pointed, like a hand raised for an oath, stands in the Valzeiner Alps (at the entrance of the Prätigau, Grisons), whose stem, four feet and a half from the ground, is seven feet in diameter.

The age of most is hard to decide, because the real veterans are often rotten at the core, and thus the yearly rings cannot be counted. Besides this, Wettertannen are very seldom felled, as they are useful in the Alpine economy, and an excellent protection against the formation of avalanches. Considering how slowly trees grow on the mountain heights, even in sheltered positions, it may safely be assumed that there are many Wettertannen 300 years old.

The question has often been asked, whether seedlings from carefully guarded lowland forests would form such tough-lived pines up here in the neighbourhood of everlasting winter, and be generally able to acclimatise themselves in these storm-beaten heights. The Alpine foresters doubt it; they think that the seeds from the lowlands are too much enervated. Plants are like men. The Spartan nature must have been in the people's flesh and blood, and been steeled by the self-help of generations—if it is not to be a mere parody. The seed of the mountain pine is, on the contrary, much esteemed for forests in the low country, as also the kinds of wheat which have grown in elevated places are used by preference for seed-corn in lower levels.

Bristly and grim as such a tree looks, as if it lived in hate and feud with all other forest trees, and had therefore withdrawn into solitude, though it looks the lively portrait of an old marked and scarred warrior, who has been a hundred times at the point of death, but always

fought himself through, it is yet a benevolent, hospitable tree. Just as one finds the most jovial and hearty company amongst old swash-bucklers and fire-eaters, so it is amongst these tree invalids grown grey in a thousand dangers and needs. It is a hospice erected by Nature, with shelter and asylum, to whose protection the cattle fly when sudden black storms are brewing, rain-clouds discharging their burdens, or hailstorms rattling down in thick masses. Certainly the fairest heads of an Alpine herd have often fallen victims to the thunderstorm in such places, when the lightning has struck them. But also in the sultry height of summer, when the sun is near the zenith, and over the whole broad Alpine meadow no shady spot is to be found, the cattle instinctively seek the Wettertanne, and couch comfortably in its cool, refreshing shadows. To this double service, in good and bad weather, it probably owes its name, as much as to its appearance.

If now such a veteran stands at the top of a pass, or at the central point of an Alpine pasture, or where paths cross, as a far-seen beacon, then it is already a second Noah's ark. Panting travellers with huge Alpenstocks, sweating porters, enthusiastic lady tourists with broad straw hats and loose hair, packed sumpter horses and their leaders, all rest, neglectful of their difference in rank, and in the midst of the cows who are holding their siesta. When all round a burning sun-yellow stretches over the broad noble landscape, and the mountains shine through blue glimmering veils of mist,—when insects, beetles, bees, and all that flies, hum round, drunk with pleasure, and vexatiously penetrating into every corner, and not a breath stirs the air as it trembles for heat,—then is a paradisaical refuge found under the shelter of the hospitable pine.

God preserve the dear noble Wettertannen !

CHAP. IX.

PROSTRATE FIRS.

EVERY plant has its region of growth, its horizontal and vertical limits of existence, within which it may live, thrive, and be propagated. Beyond these boundaries the conditions of its existence are wanting; it grows feeble and sick, becomes a crippled form, or dies out altogether. This phenomenon appears in a thousand ways; it is the foundation of vegetable geography. The palms, cacti, sycamores, dragon and india-rubber trees, the cotton and coffee plants, and other tropical productions, only get a short lease of life with us as cabinet pieces, by careful nurture in artificial hothouses; and, on the other hand, our forest growths of the fresh, cool northern temperature, our noble oaks and beeches, our fruit-bearing apple and pear trees, cannot bear the hot, dry climate of the sandy tropics. We have nothing to do with these conditions of horizontal diffusion; we have to consider the capacity of plants for extension in a vertical direction.

It is known that vines in Central Europe do not bring their grapes to perfection at a height of more than 2300 feet in sunny aspects; that the walnut may rise to 3000, the cherry-trees to about 3500; and that the garden plants and corn of the lowlands will not ripen in the rough Alps higher than from 3000 to 4000 feet. Some small experiments, which through local circumstances have



PROSTRATE FIRS.

been successful, need not here be taken into account. This cessation at certain boundaries of height appears also in forest trees. Pine trees rise, as we have already stated, in united masses in the Alps to heights of about 5500 feet above the sea. But the vertical limit becomes far less as we approach the north. Thus the *Pinus sylvestris*, between the 46th and 47th degrees of north latitude (in the Alps) reaches in its normal form to 6000 feet above the sea, whilst in the Scandinavian Dovrefjeld, at 62° of north latitude, it rises only to 2800 feet, and in Jemtsland (Norway), under the 63rd degree, to only 1500 feet. At these boundaries it loses its appearance as a tree, and assumes a dwarfed form, becoming almost a bush, and is called in the Rhætian Alps *Krumm* or *Knieholy* (bent or knee timber), in the Tyrol *Sprutföhre* or *Reischten*, in the Italian Tyrol *Müghi* (from the botanical name *Pinus mughus*, or *vice versâ*), in the Salzburg mountains *Lätschen*, in Austria *Lägken*, in the Romansch *Zuondra* or *Zundern*, and in German Switzerland, most significantly, "*Legföhre*," i. e. creeping fir. From the variety of this nomenclature, it is seen at once that this dwarf pine is extended through the whole Alps. With the "Alpenerle" or "Droosle" (*Betula alnus viridis*), a similarly dwarfed form of the "erle" (alder), it determines the highest limits of growth in the mountains. Whether it is to be considered a different species, or a mere variety dwarfed by circumstances, is a matter of dispute.

The general impression made by the "*Legföhre*," as well as its whole appearance, is singularly original, so thoroughly do its vegetable attributes answer to the character of the high mountains. The wood and the boughs bend and creep, giving rise to the strangest shapes. Although the ramification of other trees may

here and there present wonderful figures, still we may trace in them more or less distinctly the marks of a designing architecture, and the sway of determined laws impressed upon individuals and their relationship, though often with various applications in trunk, boughs, and shoots. All this disappears in the Legföhre. It everywhere bears the impress of an unsymmetrical existence, confined, hemmed in, and oppressed. It winds slavishly along the earth, like a worm or some strange snake, groaning, but still it appears to sneak through life with endless toughness. It is amongst conifers the most complete opposite to the victorious and triumphant *Wettertanne*, repelling all attacks. The resistance of the dwarf pine is only quiet and passive, which only contrives to carry out and establish its rights by the curling upwards of the ends of its boughs. In spite of this suffering appearance, the generally smooth brown stems have something fat and massive about them, whilst the bark of the common fir is generally rough, thin, rent, and dry. The colours of the leaves are very permanent. According as the stem is more in a straight line, with a high and stiffly rising crest of foliage, or creeps along the ground as if wounded, full of knots, and with short, thickly clustered tufts, the Legföhre is divided into the more slender *Pinus pumilio*, which generally occurs in lower situations, and into the very dwarfed *Pinus mughus*, which rises almost to the snow line, and prefers the limestone to the granite rocks. As the original branch formation of the pine is in tufts, the boughs and twigs of the Legföhre cross, creep, and interweave themselves in their narrow space so inextricably, that they can scarcely be paralleled amongst creeping plants. To unravel such an entangled mass of boughs might be counted amongst the Herculean labours. This

depressed horizontal growth is caused by the six or eight months' reign of winter, who here places his foot tyrannically on the neck of the plant, crushing it with enormous burdens of snow, and only allowing it to breathe for the short pause of summer. The extraordinary pliability and elasticity of the slender stems, at most two or three inches in diameter, adapts them to this enormous pressure. The steepness of the slopes in which the Legföhre most delights increases this power. The steeper it is the more closely these dwarf trees lie pressed together. Where the ground is more level, the stems rise more easily, and sometimes reach a vertical height of fifteen feet.

The stems take the strangest shapes where they hang over projecting faces of rock. There they make use of their acquired sovereignty in the most singular shapes, form all kinds of arabesques in the air with their spiral windings, and hang with their long arms like waving trees over grisly abysses.

Foolhardy goat-boys, when they are pasturing their herds above such rocky cliffs, often sinking many hundred feet, retire, in contempt of danger, merely to pass the time, on to these fearful natural swings, and there, without giddiness, perform all kinds of acrobatic feats with hearty shouts. Such a rash herdboys, on being rebuked by the parson with the warning, "Your holy guardian-angel held you by the arm that time, or you would have fallen over and been killed," answered impudently, "Mr. Parson, *I* shall go over there, if my guardian angel won't."

The needles of the Legföhre are arranged like those of the Scotch pine, two or three in one sheath, and are grouped in tufts, which give the bough the appearance of a thick bristly pencil. The Legföhre has a very feeble

power of reproduction. As it cannot be propagated by cuttings, its planting is brought about entirely by seeds.

Even in the fruit of the Legföhre the strangeness which answers to the mountain character appears. Whilst the ordinary pine casts its long conical fruit yearly, the Legföhre keeps them through the winter on its boughs, after they have become ripe in September, with the enclosed seeds, and drops them late in the spring, when the ground is free from snow. Even after this, the opened and now spherically diverging scales of the cone remain some years longer sitting on their tuft, till they at last fall off grown grey by weather, in venerable antiquity. So it comes to pass that at the beginning of July there are to be found, on one and the same bush, male and female, orange-yellow, carmine-spotted flower-cases, and the dead withered seed-holders of the third year, close to each other,—a phenomenon which seldom occurs in the vegetable world.

The Legföhre is one of the most modest of plants. Where no other kind of wood, or, at the outside, only mosses and saxifrage, could exist, it clothes the huge, pale, dry limestone cliffs with its thick, deep green colonies of bushes, forming, especially on the southern slopes, at a height of from 5000 to 6000 feet, thickly woven coverings often so compactly intertwined that it is possible, in the most literal sense, to walk upon branches and foliage. This, however, is a risky undertaking, on account of the extraordinary elasticity of the mass, and leads much more easily down than up hill, although the bending boughs stretch out their hands, so to speak, to the climber. For this reason the mountaineer generally avoids them, and prefers making a *détour* over ice or loose stones to crossing these foot-entangling traps. This dwarfed wood is also found on mica schist, in damp muddy hollows; and isolated examples have been met with at heights of only 2500 feet

above the sea. Floods, avalanches, or the wind may have transported the seed. It has even been found in the extensive moors between Augsburg and Munich, and on the "Häspelmoor," at a height of 1600 feet, where it is called "Sumpff-föhre," or swamp-fir (*Pinus uliginosa*). Other plants seldom grow amongst the thick bushes of the mountain Legföhre. Nay, not even any parasites are ever to be found on its smooth stems; at the utmost, the gold-yellow *Cetraria juniperina*, a mountain lichen related to the Iceland moss, occurs here and there.

As man flies from this impenetrable thicket, it is all the more welcome to the Alpine game, as a refuge where it can hide from the pursuit of the sportsman. Bears especially delight in it when they are pursued, and after they have reached this asylum they are tolerably safe from attack. Hence the bushes of Legföhren are called in Davos (Grisons) "Bären Krys." Mountain foxes crouch there for a time (their proper home being generally under rocks) to lie in wait for booty; the marten hunts there, and the white hare (*Lepus variabilis*) takes refuge in it. Late in the autumn it is the favourite haunt of the blackcock (*Tetrao tetrix*), and on the border of the snow-fields the "Weisshuhn," or Alpine ptarmigan (*Tetrao lagopus*) nestles under the protection of its small thin bushes of dwarf timber. Its constant inhabitant is the ring-ouzel, which builds in this cover twice a year—not to speak of such passing visitants as the mountain finch and crossbill.

Much as this fir cover pleases the sportsman, because he generally finds game in it, it makes a dull, almost mournful impression upon the admirer of nature. Indescribable monotony, in spite of its strange varieties of boughs,—mournful, dreamy melancholy hangs over these dark slopes. A feeling of isolation creeps over the traveller whose path leads through the bushes of Leg-

föhren. It seems as if Nature had gone to sleep, and one is involuntarily reminded of Grimm's tale of the "Dornenröschen." The knee-timber is on the mountains what the heath is on the plains. Smugglers on the frontier use it for places of rest, and to deposit their burdens, and many a fight has come off in such places between them and the customs' officers. The Legföhre is most massively developed at Wolfgang, near Davos (Grisons), and on the Ofnerberg, in the Lower Engadine, down to the Alp Stabl-dschod; it occurs also over large districts on the slopes of the Scarlthal. Smaller examples may be found everywhere in the limestone Alps at heights of 5000 feet and upwards.

The Legföhre, finally, is no bad wood, nor worthless in the forest economy. It is a very useful conservative plant of defence, a stubborn dam against the devastating influences of the Alps. It is a provision of Nature equivalent to man's devices of ban-forests, &c. Without the Legföhre many vigorous Alpine meadows, with their luxuriant pasturage, would no longer exist. Rolling stones and débris from the mountains have already destroyed many an Alp. Its rough interwoven boughs receive the first masses of snow that fall in the autumn, and by this means bind down all the later snow in an inclined plane. It thus positively hinders the discharge of ground avalanches and the desolation that accompanies them. In the same way it energetically restrains the fall of stones, and, like a natural work of fascines, catches all the rocky fragments that come down. Moreover, it lets the wildest torrents of rain pass as through a filter, and is thus of great assistance to the increase of good permanent springs, and the maintenance of the lower slopes of turf; finally, it favours the formation of soil under safe protection, by the deposit of its leaves.

Till very lately, they have been only valued for this

indirect service; at the utmost the mountaineer drew from them some fuel for his châteaux. But lately a dearth of wood, and a more rational management of the forests, have increased the value of the timber, and they are now cared for like the regular forests. As fuel it is almost equal to the beech, and the charcoal derived from it is highly valued.

CHAP. X.

ALPINE ROSES.

BEHIND Oberhausen, on the Lake of Thun, rises a steep jagged wall of rock, so inaccessible that even chamois avoid it. No hay-cutter ascends it, to mow the grass which grows there, at the risk of his life. No root-digger pursues his toilsome trade on its walls, and yet the rarest and most lovely Alpine plants grow there, such as are not to be found for a long way in such brilliant and deeply toned colours, especially the purple, almost deep red "Fluh-bluemli" (*Primula-veris elatior*), an ornament of the straw hats worn by the Oberland maidens in summer feast-days.

In the dim old days there lived a very rich peasant at Oberhausen, with an only daughter; she was the fairest maiden all round the lake. Though she had many suitors, none seemed good enough for her hand. One, however, was devoted to her with his whole honest heart; but Eisi (Elizabeth) rejected him like the others, and sent him off about his business. Once on the evening of an Alpine Sunday, as the lad was treating the maiden to wine, she seemed to listen to his protestations, and said she would be his wife if he would fetch her "fluh-bluemli" (*i. e.* cliff-flowrets) from the well-known rocky point. Instead of being startled, John agreed to the proposal, for he was a desperate climber. At the first grey of morning he

hastened past the Geribach to the wild cliff; like a squirrel he climbed round the slippery walls: the narrowest clefts, the most trifling ledges, helped him on as he clung tight with toes and fingers. His hard task was all but done, he saw the point close to his head; he had grasped one, two, three flowers, when a stone crumbled, he lost his balance, and in the next minute, after a fearful fall, he lay dead at the foot of the cliff. A few hours later Eisi went merrily singing past the rocks—one look, and she sank fainting by the side of the man whom her pride had killed. The faithful lad still grasped the flowers in his hand. Remorse broke Eisi's heart.

“U—n—a der Fluh, wo Hans isch g'lege,
 Wachst us sym Bluet e Blueme—n—uf;
 D'Alprose, wie 're die Lüt jetz siige—
 Ihr Meitleni get Achtig druf!
 Die Bluemi da sy roth wie Bluet,
 U stah im dunkle Laub gar guet.” *

So says the popular legend of the origin of the Alpine rose. None of the mountain flowers has been so celebrated by poets as the Alpine rose; no flower has been so poetically interwoven with the mountaineer's life; and none calls up to the mind of persons, unacquainted with the mountains, so incorrect an image. If, keeping to the name of “rose,” he transfers it to an Alpine relation of the queen of flowers, the mountains would not give him the lie. On the contrary, the Alps have given a new poetic beauty to the rose; for it is amongst them that the rose blooms without a thorn, and that the proverb loses its truth. That is the real “rose of the Alps,” the charming *Rosa*

* “On the cliff where Hans was laid, a flower grows out of his blood,—the Alp rose, as folk call it now. Beware of it, ye maidens! The flowers there are red as blood, and stand right well in the dark leaf.”

alpina, which frequently occurs in the high orest-glades of the subalpine region, and descends to the borders of the vineyards. It forms bushes, and flowers in June and July. Still, when people speak of the Alpine rose, they do not mean this flower any more than the Alpine violet (*Cyclamen europæum*) refers to a true violet. The poetical sense of the people calls that plant Alpine rose, which is known botanically as *Rhododendron*, and in German "Rosenbaum." This designation, however, does not give a proper representation of the reality. On the contrary, it introduces a new ambiguity; for originally this poetical name was given to the oleander, and it was Linnæus who arbitrarily transferred it from the southern plant to our Alpine wreath. The name of Alpine rose is not often heard properly from the people; almost every valley has its own name for it. In the Bernese Oberland it is called "Bärenblust," in Entlebuch and Unterwalden "Huhnerblume," (because the Berghuhn or ptarmigan is found in it), in Uri "Juupe," in Glarus "Rafauslen," in Aargau "Herznägeli," in the Zillertal, in Tyrol, "Zundern," in Ticino "Dros," &c. The family belongs to the heaths, or to the still more nearly allied bilberries. There is no plant with which the Alpine rose can be better compared than the whortleberry (*Vaccinium uliginosum*) or the *V. Vitis Idæa*, which sometimes grow in the Alps at heights of 7000 feet. With their low thickly-branched bushes, the Alpine roses call to one's mind also the box-tree, especially in their foliage; but they have nothing at all in common with it. They form a small family of their own, which have been called *Rhodoraceæ*, and embrace the three species: (1) the *Ledum*, which grows in the northern hollows and peat-valleys; (2) the *Azaleæ*, which occur in the Alps from heights of 5000 to 7500 feet, only as a tender evergreen creeping plant (*A. procumbens*), with rose-coloured

blossoms ; and (3) the *Rhododendra*. All three have the peculiarity in common, that their leaf and flower-blossoms are enveloped in great husks, for which reason they come in tufts out of the branches. We cannot generally observe the moment of development, because it almost always takes place beneath the snow. As the spring rises step by step to heights of from 4000 to 6500 feet, and its soft breath puffs away the covering of snow, the light-brown hornlike armour of buds is already there, and leaves and flower-buds are curiously stretching out their young fresh green to see the splendour of their mother, the lofty Alpine world. The traveller does not see all these phases ; he does not enter the rich garden of the Alps till July and August, when the rhododendron is already blazing in rosy flames, and has shut the ruby-like bell of its calyx. “ With
 “ what pleasure does the tired wanderer greet the first
 “ wreath of Alpine roses, and hasten, in spite of his exhaus-
 “ tion, up to the rocks, from which the rose nods a smiling
 “ welcome to the Alps. How often they accompany him
 “ with their constant grace, through long labyrinths of rock,
 “ and speak to him of life and enjoyment in a desolate world
 “ of grim rock-ruins ! Everywhere the Alpine rose deco-
 “ rates in a thousand ways the thousand changes of its home,
 “ glowing in a single rosy flame over the foaming glacier-
 “ brook, or drawing over the whole hill-side its purple
 “ garment reflected in the Alpine lake, or scattering its
 “ blossoms companionably through the many coloured
 “ flowers of the Alps.”—(*Tschudi*.)

In the Alps there are only two varieties of one species. The most extensively distributed, which rises to heights of 6500 feet, is the rust-coloured (*R. ferrugineum*, in Romansch *Flur bella*), so called because its lancet-shaped, dark-green, tough, leathery leaves are thickly covered on their lower surface with small, scarcely

visible rust-coloured spots, which give to it a deep red ochre, or almost a coffee-coloured hue. It is the old leaves, which have passed through the winter, that are so embrowned on the reverse side; the young tender leaves smile at the points of the boughs in the liveliest spring-green, and, till the autumn, form a striking contrast by their fresh colour to the solemn look of the old leaves. Not till late in the year does their youthful appearance vanish and a slight golden tinge pass over their backs. The other form, the "Gefranzte Alpenbalsam" (*R. hirsutum*) has fringed leaves of a more oval form, set round with long white hairs. The leaves are generally equally green above and below, but sometimes have clear brown spots scattered thinly over the reverse side. It generally occurs in the deeper and shadowy rocky mountains, especially in the Eastern Alps, and while it never rises above 6000 feet, it is occasionally found as low as 2000 feet. Its burning red umbel of flowers rises from the background of leaves in June and July, composed of from six to ten bright flowers of five petals. Its tenderly formed transparent bell shines in the midst, as soft as velvet, almost like a camellia; but on the exterior surface it is sprinkled with very distinct spots of a sulphur colour, which give it an obstinate, hard, and robust appearance. The Alpine roses vary much in brightness of colour, from the most tender rose to a glowing carmine. The depth and glow of the colour generally increases with the height of the locality. The hairy Alpine rose is generally the paler and clearer, sometimes passing almost into a faint violet tinge. A great rarity is the white-blossomed Alpine rose, which is said sometimes to occur in the Maderaner Thal (near Amsteg on the St. Gothard), in some of the Valaisan lateral valleys, on the Hundwyler

heights (Appenzell), in the Paynaun, in Tyrol, and in the Pinzgau.

Where large spaces are covered with blooming Alpine roses, as on the Itrammen Alp (on the way from Grindelwald to the Wengern Alp), or on the eastern slope of the Alpsiegel (near Weissbad in Appenzell), or in the thin forests on the ascent from Zermatt to the Riffel, or in the Fex-thal of the Upper Engadine, there shines a bright ruby-coloured flame, visible from a great distance, which for its extent may be compared to the flood of blossom on an orchard in May. As on the orchard, there is a spring-burst of budding, and crowding and nestling together, a whole college of bloom, an exultation in their common youth,—one might almost say a millionfold concert of colours. And the Alpine blossom has another resemblance to the tree. When the carmine flower has enjoyed its life and the hour of departure is near, it does not wither, dying by degrees on its stalk, or losing its lovely glow of colour, and miserably shrivelling up like many of the most beautiful flowers: it looks joyfully round once more at the white mountain-tops and at its beloved companions, and jumps at one spring into the forest brook that rustles by, or the foaming mountain-stream, and disappears from human sight.

The Alpine rose is an obstinate plant. It does not easily allow itself to be transplanted to lowland gardens and lordly parks, slavishly to adorn the beds according to the will and pleasure of the connoisseur with all the servile crew of plants; it is not a venal flower to do any one's bidding. A free child of the free hills, it will only blossom in its own home, where it is nearer to heaven than to men, and can breathe full draughts of the pure air of heaven. It is the most charming symbol of

maidenly purity and innocence; there is scarcely any plant which when broken so soon loses its beauty and the fire of its colouring, and sickens to death. Weather and storm, heat and frost, rain and snow, all the attacks of nature, it can bear with good cheer and courage, only too happy when it gets a friendly ray of sunlight. Only at the touch of man's hand it trembles and loses its colour, for that brings its death. With surprising speed it changes its clear transparent purple-gold into a bluish tinge, and no one has seen Alpine roses in their full splendour who has not seen them blooming on the slopes of rock.

CHAP. XI.

THE SOUTHERN VALLEYS.

ITALY is the favourite land for youthful dreams of a fair ideal. Every scholar who dwells delighted on his Virgil, Horace, Ovid, or Tibullus, travels in thought to the classic land of the Romans, and longs for the time when he will be able to follow his favourite poets step by step. If in later years his wish is fulfilled,—if he hastens over the Alps down to the Lombard plains on his pilgrimage to Rome, sees the Sabine heaven grow blue above him,—if he repeats thoughtfully, in the grottoes and cascades of Tivoli, the ever recurring “*Ille terrarum mihi præter omnes angulus ridet*,”—it will certainly come to pass that he will return rather cooler than he went.

What is the cause of this common result of an Italian journey—of this unexpected disappointment?

There is one circumstance which exceeds many expectations and at the same time perceptibly weakens later effects, viz. the introduction to the Italian journey—the first day beyond the Alps. The increase of beauty in the landscape is so striking, so absorbing to eyes and sense, when one descends from the St. Gothard or Bernhardt, that after such an overture one naturally expects a more lively crescendo, a further increase of nobility in the landscape. But when one has once left the paradise of the Lombard lakes, this does not happen

to the degree expected, but on the contrary there is a falling off in the interest.

Incontestably the descent from the Alpine heights to the southern valleys, so often lavishly adorned by Nature, is one of the most striking incidents that happen in travel. Already on this side of the mountains a deep impression is made upon one's spirit. Before the St. Gothard yawns the wild, lifeless, ruin-covered gorge of Schöllenen, which does not cease till the cliffs of gneiss meet near the Devil's Bridge. For a few moments a free breathing time and a peaceful rest are gained in the idyllic Urseren-thal. Equally terrible gates close the two eastern commercial roads to Italy over the Bernhardin and Splügen in the Via Mala and Roffla gorge, or the pass of the Great St. Bernard in the defile of Marengo. In all these passes it is there that the first real ascent begins, to the treeless, half-dead heights; in dull monotonous zigzags galleries and houses of refuge lead us constantly upwards where in the bad season death is lying in wait for the traveller to clutch its prey with the spring of a lion, in the form of an avalanche or in the fearful whirlwind of a snowstorm.

By this time our delight in the bright, blooming nature has sunk to freezing point; we have almost left the world of organic life; we have reached the barren pass of 6500 feet high, when there suddenly opens upon us, narrow at first, but gradually extending, a glance into a new life. The first hour shows but little; but here and there the charming cushions of *aretia* with bright white eyes of forget-me-nots, the red pinklike *silenes*, and the modest *androsaceæ*, greet us, as they gather into companies. Further down we meet *anemones* and *veronicas*, plants with woody stalks, and along the rocky walls above us creep the *lazzaroni* of

the mountains, the Legföhren, heralds of the tree-region. How joyfully we greet the first pines or larches ; we take off our hats to them as to dear old acquaintances.

Now it increases at each turn of the road. The single trees gather into groups, and pass into small forests, which climb up the lateral slopes of the valley. Round domes of foliage are intermingled, and the white-stemmed birches shine to us from the distance. The whole world of plants grows richer, and increases in power, height, and life. Round one more corner of the road, and suddenly the view opens far into the chief valley at our feet. The mountain shoulders run down from each side, sinking into a faint blue in the distance. Villages, hamlets, slender church-towers appear, and the long narrow line of the road shines like a thread. There it stretches, far away into the land of our dreams. Soon we reach the first habitations. The thick stone walls and narrow window openings show that here winter still rules long and sternly, though it looks so summer-like, so warm and full of life after the barren heights. The people beneath the Splügen, on the south side, have named a district of this kind Campo Dolcino, though to people who are leaving Italy it already looks unfriendly and "indolcino" enough. But what is it compared to the next district? Vegetation swells and bursts, life is strong in every plant, all seems massive, solid, and abundant. The increase of natural life is in more than a regular proportion, smiling clearly from every bough and group of trees. It is as if our eyes had been half starved higher up ; now they are ready to exult at the most modest nourishment. We feel like a poor man who has been brought up in care and want, and suddenly thinks himself a Cræsus, when he has first got a gold piece of his own in his hand.

But patience, we shall soon be sitting at the rich man's table.

When we have once passed the ravine of La Cluse on the Great St. Bernard, of Dozio Grande on the St. Gothard, or the bar of ruins of Misox, under the Bernhardin, and the valley terrace of Stozzo on the Splügen (the natural boundaries of the vegetation pressing up towards the mountains from the warm lands of the south), new pictures open unexpectedly before us. They are still the same valleys, bounded by high rocky mountains; but the wild beauty, the proud look of challenge is tamed down. The grand severe outline, the full broad shading, the firm, decided drawing, so unmistakably characteristic, have disappeared. As though in play, nature has lavishly covered and decorated the country with every kind of ornament from her inexhaustible treasures. There is certainly something feminine and coquettish in it as compared with the quiet manly magnitude and the stoical earnestness of the valleys on the northern side. Thorough enjoyment of life breathes through the whole country, and a thousand enchanting little groups enchain one's sight.

New forms of plants claim attention; or, where they are old acquaintances and friends, they take a more elegant shape. First come the full juiced stalks of maize, as high as a man's head, with their broad, pendulous, shield-like leaves, types of luxuriant fullness of life, covering the fields in the valleys far and near. The Indian corn (*zea*, *melgone* in Ticino Italian) must here produce half of all the cornstuffs; wheat and rye are here already golden and ripe for cutting (*Biava*), whilst in Germany they are still a dead pale grey-green. The pines have left the valley to take refuge on the hill sides; below grow only the round foliaged trees. The

walnut-tree, and the dark elm-tree appear in masses. The last, however, cannot crush the cheerful carelessness of the landscape by its melancholy. A courageous parasite surrounds it with its leafy net, and creeps humorously up to the dismal old grumbler. This is the merry vine, which winds up in careless fun, and swings its breezy garlands from tree to tree. The vines have a genial *laissez aller*, a graceful wilfulness, when contrasted with the guarded grapes of our vineyards anxiously held from the winter with bit and bridle. Here it shows its true nature, the fiery spirit lives and stirs in it, which it imparts to its grapes as a springing well of life; and even when it has been fastened down, when practical utility has tried to set bounds to its wild growth, it still retains liberty enough to embrace the companions of its youth in low bowers of leaves.

Further on we meet the mulberry, whose leaves are destined for the silkworm; the ugly fig-tree, with its thin foliage, and another tree which pleases us by its imposing growth, by its shiny crowd of leaves, and generally by its marked pre-eminence above its neighbours. This is the chesnut, the greatest ornament of the southern valleys. Every isolated tree, with the mossy block of stone, or cottage below it, and close behind it the impetuous, unchainable, clear green mountain stream, and the pale, misty violet of the background of mountains—every such group is a study by itself.

CHAP. XII.

THE CHESNUT-WOODS.

THE chesnut rises like a picture of southern vegetation full of life, grace, and richness, with its strongly marked forms, above the bushes of the little side ravines, which are carved in the southern slopes of the Alps. Its lofty foliage strongly calls to our minds the splendid beech forests of Germany and Denmark, but, under the powerful influences of the warmer climate and the magic colouring of the southern light, it excels them in luxuriance and brightness of colour. It is an Epos, an Odyssee of the world of trees, bold and absorbing as a harmony of Palestrina, rising jubilantly like the Hallelujah in Handel's Messiah. Above, on the other side of the Alps, strange feelings creep over the traveller in the black melancholy ban-forest with its dreams of bygone days. Melancholy broods over its solitudes, and the spirit of the Alps moves over it in cold sublimity.

Here, in the chesnut-forest, the enjoyment of the present is everywhere, fresh abounding life. It lies certainly in a far deeper zone of vegetation than the other. For whilst the high pine-forests of the Alps occupy as a rule the region between 3000 and 5500 feet, the chesnut-wood reaches its mean boundary at 2700 feet, and occurs quite exceptionally at Saglio in the Bergell, at a height of 3500 feet. The most beautiful woods of this kind on the



CHESNUTS.

Alps are found in Piedmont and the Italian Tyrol. Besides these, the chesnut is distributed through the whole of Southern Europe, covers vast plains in Northern Greece, and rises in Middle Greece to great heights on the mountains. In Spain and Portugal it covers the higher mountains in great masses, or draws an enclosing girdle below the colder summits, and shows itself as a large forest tree in the Cevennes and the Limousin. In Germany it is found only as an isolated ornament of the parks.

The Spanish chesnut (*Fagus castanea* or *castanea vesca*), is a genuine mountain tree of the south, not to be confused with the wild or horse-chesnut (*Æsculus Hippocastanum*), which is often used as an ornament for avenues on account of the fan-shaped disposition of its leaves, and consequent thickness of foliage. Growth and timber, flowers, leaves, and fruit are quite different. But the Spanish chesnut also varies according to the locality in the physiognomy of its stem and boughs, so much, that a man would scarcely recognise them in isolated trees, who had only known them in the forest masses.

Here (in the forest) the cylindrical stems grow straight up towards the clouds with manly freshness and boldness. Power and muscular strength appear in every fibre. It stands in an intermediate relation to the straight close-grained stem of the smooth-barked beech, and the nervous roughly-splintered oak. On every side it has the appearance of being come of a good race, and is of an independent bearing. As long as it is young, the stem is clothed in a juicy, firmly clinging bark, whose olive green tissue of cells shines through it; it is spotted over with white lenticular points which give it a young cheerful appearance. After the first twelve years of its youth, when it is about twenty feet in height, it gains a variegated overgrowth. The ground tone of its dress of bark

is a greenish-grey, relieved by clear silvery spots, deceptively like the German beech. In both this change of colour is derived from lichens (*Verrucaria epidermidis* and *analepta*), which cover the stem in broad sheets. After another twelve years, the tree reaches the age of manhood. Its bark dries, and the colour changes again as the subjacent layers of sap die out. The wood then extends in height and breadth; the circumference of the stem increases considerably; the bark tears, and splits traverse the now dark brown armour of the stem.

The development of boughs and shoots begins tolerably high up in the forest chesnut, and strikes out to a great distance in strong closed lines, so that the neighbouring trees, with their rich foliage, form a thick vaulted roof of leaves. As in the compact pine-forests, the chesnut-woods preserve a tolerably cool place of refuge in their dim shade through the hot summer months. Such places are wanted in the little southern valleys. Their floor is often surprisingly narrow; there is just room for the rugged road, creeping slavishly round all the curves, and the crystal rippling mountain brook, side by side, and then on both sides the ground rises in tolerably steep slopes towards the heights.

The full burden of the sun's rays lies on these deep gorge-shaped cuttings, and heats the rockwalls often to a high degree. No village, hamlet, or house lies down in the valley. They are all high upon the beautiful green mountain slopes. On the south of the Monte Rosa group every place is composed of numerous little scattered communes (*carboni*), consisting of solid respectable stone houses in the Italian style, and each of them with a chapel. But many of them are hardly visible, because they are nestled in the waving chesnut-woods. A charming idyllic picture of this kind is formed by the village

Rossa, where perhaps the noblest chesnut-forest in all the Southern Alps is to be seen. This high situation of the villages gives to the Monte Rosa valleys in Piedmont an appearance very different from that of the northern valleys. From the ornament conferred upon them by the diamond-clear brooks, with their play of light-green colour, and the crystal basins of water which they form, these valleys would be the most beautiful in the whole Alps, if only the mountain heights were richer in colour and form. But they frequently pass into a really dismal monotony, which is especially predominant in the Graian Alps.

The trees are not everywhere so thick. Formerly a thick chesnut-forest covered the Monte Cenere, over which leads the much frequented road from Bellinzona to Lugano, but as it gave shelter to many robbers and highwaymen, it was considerably thinned. The trees gained by this in light and space, and now display uncommonly fine branches.

There is a great difference in the free isolated tree. At first sight it is as like the German winter-oak as its own reflection, both in the courageous independent form of the chief boughs, in the broadly-marked knotty formation of the short four-sided stem, in the pimply discoloured bark, and in fact in the whole style of its woody architecture. As in the oak, there are many stems of great diameter, and a circumference of from twenty to thirty feet is not rare. In the Val Misocco there is one which measures thirty-two feet at three feet from the ground. The most celebrated tree is that on Etna, called "Castagno di cento cavalli," whose circumference is 180 feet. But as its height is by no means in proportion to its mighty breadth, it appears a little way off like a gigantic bush. In fact it does not display one massive

stem, but a group of five colossal branches, which rise from a foundation now hidden under the ground.

The chesnut is extraordinary for its capacity of transplantation and reproduction; it is one of the toughest-lived of trees. Stems as hollow as an old spectral willow, in which several men might find room as in a tent — improvised houses of refuge — some even in which the goatherd (*caprajo*) is accustomed to light his fire to cook his scanty meal of polenta, and whose inside surfaces are blackened charcoal, have green lively crowns of foliage. A strip of bark a few feet broad, which rises against the nearly bare stem, brings sufficient nourishment to the leaves.

In proportion to the noble manly bearing of the stem, its proud leaf cupola, and its vast spread of branches, is the characteristic form of the leaves. The long lancet-shaped leaves stand up with obstinate expression of being their own masters. They would remind one strikingly of the ancient reward of the minstrel, the nobly shaped laurel leaf, if they belonged to the harmless peaceful form of leaves. But a knightly blood flows in their veins, as children of their proud upright father. Sharp slightly bent points stand round their rim, as ends of the leaf skeleton, arming each leaf and giving it a thoroughly energetic character. Their whole tough tissue is firm and lasting, strong and solid, and the fresh deep green surface of each leaf is smooth and shining. As the whole tree may be put on a level with the emblem of strength and courage — the German oak — in its heroic architecture, the leaves may be no less compared with it for their free natural growth.

Finally the fruit and its husk is not less distinct and singular in its form than the stem and leaves. None of our European trees envelop their seeds in such thick husks,

well armed with long sharp pointed needles. The fruit of the horse-chesnut has a similar shell, set about with sharp prickles; but its thorns are short, standing far apart, and remind one chiefly of the middle-age weapon — the morning star. The shell of the edible chesnut (which ripens in October) is an armed “*noli me tangere*” against all attack, — an impregnable ball of needles, — a perfect miniature portrait of a rolled-up hedgehog or African porcupine. If it did not of itself split into three parts on growing ripe, like the husk of the beechnut, it would be hard to extract the chesnut from its firm armour of thorns. It is well known to form one of the principal materials for the food of the lower classes in the South of Europe during the winter months, where it has to supply the place of bread. The value of the chesnut, however, has apparently fallen off, in consequence of the steadily increasing growth of potatoes. In Italy, “*chatigna*,” a broth prepared from the chesnut-meal with salt water, is a daily food on the table in many parts. In Tessin the fruit is eaten both boiled, “*farud*,” and roasted on the gridiron, “*brasch*.” They may be kept a whole year if skilfully dried. A strongly bearing tree will produce five hundred weight of fruit in favourable years. The harvest in Corsica alone is valued at 100,000 crowns yearly. In the Bergell, where whole forests stand on the mass of *débris* from the landslip which buried the village of Pleurs in 1618, near Soglio, and farther down, there is a proverb, “*Quantas moscas, tantas castanias*,” which means to say, “As many flies as a summer produces, so many chesnuds there are in the same year’s harvest.”

The above-mentioned locality near Soglio is especially interesting, because there the *pinus cembra*, which is proper to the cold snowy climate of the proper Alpine region, ripens its cones with their sweet edible kernels

in the immediate neighbourhood of the chesnut, and both trees form the complex forests called "Branten."

But even after its death, after it has ceased to adorn the landscape as the fairest foliage tree of the South, and to give nourishment by its fruit, the chesnut still shows itself a nobly distinguished tree by the value of its timber. For this is close to the oak for firmness, durability, and solidity, and would even in its physical properties be quite equal to oak wood, as its yearly rings are widely separated by broad walls of growth, if it was not entirely wanting in the characteristic broad rays of pith. Venice, the sea ruling town of the Doges, rich smiling Genoa, the mighty docks of England, built their giant three-masted vessels, their great ships of war and commerce, of chesnut-wood, because it is not liable to the attacks of worms and the destructive boring pholads. The mighty framework of beams at Westminster Hall in London, built by the extravagant Richard the Second of England towards the end of the fourteenth century, the roof beams of many of the noblest Gothic cathedrals of France and Spain, are made from the timber of our noble tree, and are still as strong and uninjured as they were five hundred years ago. It is maintained that even the living tree is liable neither to the attacks of insects nor to any other disease, except that of becoming hollow in its old age. But a dreaded animal loves to burrow under its roots, namely, the common scorpion. The Italians who still sometimes travel about the country with the so-called "scorpion oil," supposed to be good for the stings of poisonous flies, wasps, and bees, catch the scorpions, necessary for the preparation of the oil, by digging under the chesnut roots. Very lasting tight hoops for casks are made of the young boughs; and casks whose staves are split from chesnut wood, are said

to be almost indestructible, and to be excellent preservers of wine. On the other hand, chesnut wood is of little value as fuel — the logs shine, but give out little heat.

Such is the growth and ornament, the use and the decay, of the noblest foliage tree of the Southern Alpine land.

CHAP. XIII.

A TALE OF THE CLOUDS.

Two paths cross the mountains from the lovely corner of the Lake of Geneva, near Montreux, into the Canton Berne and the Saane-thal. One of them, La Tinière, is stony, a bad road, and little frequented, whilst the path over the Jaman is pleasant, lively, and easy to find. These, meanwhile, are not, properly speaking, passes, like those in the high cantons of Glarus, Uri, the Grisons, and Valais, or such as lead over the well-known cols from Chamouni. Their height is nowhere 4700 feet above the sea, and the path over the Jaman passes some human habitation every half hour.

In clear weather this mountain path offers incomparably beautiful views over the lake behind, and the rich picturesque scenery of its banks; but if cloud and night surprise the traveller on these heights, then progress becomes as difficult as it does everywhere in the hills, and woe to him who has no guide, or leaves the right way.

On the 15th of September 1852, I had left Vevey in oppressive noonday heat, and lounged undecidedly down the road by the lake. The solitary point of rock of the Dent de Jaman had often seemed to invite me to a friendly visit; but often as I had passed it on the steamer, it had always been out of my way. This time the Dent was quite an opportune answer to my doubts, and turning

left from Clarence, the Hohe Naye before me, I ascended between Chailley and Chernex. The vast panorama opens out more widely and grandly as we ascend. It is a picture which has no equal in the whole broad Alpine land for majesty and idyllic simplicity, in splendour of colour, and in the full harmony of its contrasts. The heavens had taken an ill-omened colour, a monotonous leaden-grey spread over the glorious landscape, and the sun seemed a faint sleepy yellow. A German professor coming with his pupils over the Col de Jaman, recommended to me the inn, "En avant," of M. Dufour; and his guide, packed like a mule with knapsacks, carpet-bags, guide-books, and botanical books, was of opinion that that would be "my best place for waiting through the rain."

I looked in annoyed astonishment after the guide as he plodded on half smiling; and a look up towards the sun, which stood glassy and rayless behind the watery vapours of the heavy atmosphere, and a strange dirty-grey cloud round the Dent de Jaman, seemed to me unfortunately to confirm the unexpected truth of the weather-prophet. I never liked turning back, even in cases where my sense of locality told me I was on the wrong road. Consequently, I put my best leg foremost. Sooner than I had hoped I came to the friendly colony of huts. The peasants of Montreux, to whom the surrounding fat meadows belong, were up here gathering their œlmd (second crop of hay). It is consequently more lively than usual at M. Dufour's, especially in the evening.

I had scarcely rested half an hour by a bottle of excellent wine, when one of the mountain peasants came in with the cheerful report "y pliau" (*il pleut*); so the guide was right. The "pliau" got rapidly closer, and as the twilight rapidly approached, the sluices of all the brooks of heaven appeared to be open. Supper—good

night—to bed—was the only cure for my discouragement. It may be better to-morrow. Towards morning, as I awoke—alas! the same weather continues. The rustling of the rivulet of water over the saturated shining roof tiles into the sounding gutter, and the plashing trickling of the drops on to the pavement, has a magnetic soporific power, like any other monotonous sound. I gave way to its influence. After nine I awoke again. A look through the window—mist and thick rain—only the fields close by were visible, Below, near the lake, the charming view was veiled by low grey clouds. The order of the day, “stay here and wait patiently,” was dictated of itself. I was, however, a thousand per cent. better off than if such a misfortune had overtaken me in a solitary Alpine chalet, cut off from all the world; for M. Dufour’s dwelling was an orderly little house, which afforded comfortable protection against the weather, and the bed in my white furnished room, although hard, was, at any rate, better than a damp Alpine couch of hay.

Wherever people are mutually intelligible, by means of speech, the traveller in search of amusement may find, even with the most one-sided and driest of companions, some back door through which to escape from the entrenchment of yes and no into the open field of communication of thoughts, and something may then be learnt of every one, even the dullest peasant. But this becomes impossible when there is no means of intercourse.

This was my case. In my schoolboy days the hours of French instruction were always the most wearisome, and I should, in consequence, have been quite without consolation now had it not been that in later years necessity had compelled me to pick up what I had neglected in my youth. I now certainly spoke French grammatically, and my hostess and some of the peasants present understood

me well ; but I could only make out her Romaisch-French *patois* disconnectedly and conjecturally. This hindrance had to be overcome. I began to acquire a vocabulary by a perfect flood of “comment s'appelle cela?” and “qu'est cela?” This produced a really comic scene. To the merriment of the collected guests, who were as much bored by the weather as I was, I started a school, but in inverse proportions, inasmuch as I was the single scholar, and had eight or ten drinking and smoking teachers round me, to whom I directed my questions, and from whom I received instruction, as from one mouth. We had a hearty laugh ; a bottle or two of Yvorne wine, which is here dirt cheap, supported my investigations, and I filled page after page of my journal. This amusement passed away a few hours, and gradually lost its interest, and outside the rain was still falling as before. The day ended as it began and the second night too. The third morning broke amidst streams of mist and rain. It began to get tiresome.

Mid-day was past. As I was looking out, drumming with my fingers upon the window, on the general washing of nature, two strong young fellows came up to the inn, one especially stronger and broader-shouldered than the other, so wet to the skin that they could not well be wetter. I knew all the villagers, my friends and teachers of yesterday, these were new faces, reason enough to heighten my interest in their appearance and persons. I asked myself, with curiosity, where are they going? whence had they come? would they stop or go on? were they strangers or at home? An arrival under such circumstances was an event of itself, and must have some weighty cause, considering the drenching rain. The biggest went straight up to the trough before the inn, up to its ever running spout,

and laying down his stick and umbrella began evidently to make preparations for something new. What! more washing still? in this thorough soaking, when his whole body must have been exposed to an involuntary bath for hours? I thought that was too luxurious. However, he drew off his thick, heavy, neat-leather boots, held them under the rushing water, and shook them two or three times as one rinses a dirty glass,—he had got sand and pebbles into them. The remedy seemed to me rather too radical, it was one only fit for man in his natural state who is hand and glove with wind and storm. When they had both come in, I heard to my no small surprise, that they meant to cross the Plan de Jaman. “In this weather?” I asked. “Why not?” was the answer. “Well,” whispered my self-esteem, “what you can do, must be possible for me—so you are really going over the Plan de Jaman?” “Ja, Herr, to Montbovon,” was the German answer of the big one, a Bernese Oberlander from the Simmenthal, who had been told by the hostess that I came from German Switzerland. “Will you be my guide?” “With pleasure, sir,” was his friendly reply, whilst his big honest eyes increased my confidence in him. “Give me your knapsack, I will carry it; I have often been on the mountains with strange gentlemen.” Done! my bill was settled, everything packed tightly into my sealskin-knapsack,—portfolio, passport, and papers; the alpenstock in my hand, farewell to the host and hostess, and out into the mist and streaming rain.

In the first ten minutes I was on a level with my guides, in point of wetness. We mounted through forest. In the gutters and hollow ways, and wherever there was any depression in the mountain's slope, the water came shooting down in overwhelming haste. Every two hun-

dred paces we had to wade these improvised brooks, and sometimes walk above our shoes in them. In a short time I might have used M. Dufour's trough, to clean my shoes of sand which the rushing water carried into them. All that had surprised me in the dry sheltered room at the inn, I was now doing with resignation, or, even more than resignation, with thorough goodwill. After about three-quarters of an hour's ascent we were on the top of the Col; on our right the splintered rock-tooth of the Jaman looked down upon us from its heavy mantle of mist, iron-grey and spirit-like. Here, where, in clear weather, that lovely prospect appears, said to be the loveliest round the whole Lake of Geneva, we stood in the cold draught, in the streaming rain, enveloped in a sea of dull wretched vapour, whilst in other places the clouds, torn by the winds, were driven past in strange fantastic shapes, like followers of the wild huntsman. The short Alpine turf had grown strangely smooth and slippery in the rain, so that it was hard to get firm and safe footing where the path was on a slope. One could not indeed properly speak of a "path," as is generally the case on Alpine meadows; hundreds of apparent paths, *i. e.* long lines cutting through the grass and plants, and showing either the naked rock or the water-rolled *débris* of pebbles,—hundreds of such paths run side by side, cross, break off, and form, especially in mist, a labyrinth not easy to be followed by one not thoroughly acquainted with the country.

My Simmenthal guide uttered a long series of clear rejoicing jodels, spite of the wetness of our clothes and the miserable weather. That is the genuine custom of the Sennen (*i. e.* inhabitants of the sennhüter or chalets). His jodels were answered from several sides, but by whom we could not see; the answers came from the mist.

We went quickly downhill, sometimes with a quick balancing step, sometimes half sliding, so that the alpenstock served almost the same purpose as in a glissade on a snow slope. In a short time we came to a large clean chalet. We were in the canton of Freiburg. Here our third man left us, and this gave us an opportunity to turn into the chalet for a little rest. The half hour we wasted by the warm, brightly shining fire was the cause of an adventure, which always frightens me even in the recollection.

When we left the chalet, the rain had become so much denser that we literally could not recognise each other, if we were not close shoulder to shoulder; at two paces off we could hardly distinguish the outline of a human form. This circumstance obliged us to pay the closest attention to following the path; and our anxiety about the way, and the unusual exertion of strength to prevent slipping, put us into such a perspiration in spite of the biting cold and rain-deluged air, that we were sweating as much as one generally does when ascending a mountain under a July sun on a hot day. It appeared several times that we had not quite kept the right direction, when we had to cross hedges and dividing fences such as generally occur in the lower hay-fields of the Alps. A dozen or two paces to the right or left, and we always recovered the right path, which passed through a gate, or, as is more frequent, was marked by large flat stones, laid like steps, which enable one to cross the light fence-work. So we went on for some time. We had not entered the inn "*En allières*" in consequence of the rapid approach of night, for it was already decidedly darker. We now had again to cross a tolerably high hedge, and according to the process by which we had hitherto succeeded, we went along it to discover the point of crossing. On our right it sloped gently down, on our left it rose. We

sought,*but in vain; we did not want so much to find a convenient passage over the hedge as to assure ourselves of the right way by finding the usual passage, for we could not possibly go wrong when we had got about ten minutes further. By repeatedly passing up and down the hedge we had lost the point at which we had first struck it, and night was coming on more decidedly as we wasted time in searching. Another good cast uphill — not a trace of what we sought; downhill again through the dark grey mist, and at a quick pace, but with just as little result. It began to grow very steep; — still nothing. My guide, who was growing impatient, sent up some signals for help in the form of clear long-drawn jodels; but no answer. He repeated his cries in another tone, with all his lively power of voice as Alpine as if he had been in the most cheerful frame of mind, but as uselessly as before. In spite of the fact that our position began to be rather anxious, I could scarcely help laughing at this forced cheerfulness produced by perplexity and anxiety. What next?

“We must go downhill, mustn’t we?” “Certainly, sir. By my reckoning it is a short quarter of an hour to the Hongrinbach, over which the first bridge leads, and then there is a broad path through the forest.” “Well, do not let us wait any longer; we’ll break through the hedge. Keep downhill, not too much to the left or right, and when we come to the Hongrinbach, follow it till it brings us to the bridge. Don’t you think so too?” After some delay my guide agreed to my proposal, as being the only plan, under the circumstances, for gaining our object. So said, so done. The ground got steeper, the mist and night a darker grey, our situation in our damp clinging clothes more and more uncomfortable, and rain flowed incessantly and abundantly.

We might perhaps have been stumbling, clambering, progressing somehow for a quarter of an hour or more, when a rushing sound seemed to warn us that we had reached the Hongrinbach; but there it went down as steep as a church-roof. Several attempts showed that we had better keep to the right; so on we went again in this direction: the cloud had lifted a little, so that, as far as the night would permit, we could distinguish objects close round us. A dozen more paces, and the white foam of the rushing water shone up to us. Now we had to climb along by the mountain brook till we should come to the bridge. With unusual exertions, through wild bushes and thorny boughs, which scratched our skin cruelly, and tore our clothes, we laboured slowly along. The slope was often so steep that we feared at every step that we should fall into the stream or break our necks; my guide kept on proving with his stick how far we could trust, for we could hardly see where we trod. After passing a good many such difficulties, our further passage was suddenly cut off, for on our left foamed down a stream some six or eight paces broad, which flowed into the Hongrinbach. If we could not climb up the slopes which we had descended with unspeakable trouble, without being a hair's-breadth better off there than here, there was only one thing left to us, to wade through the shooting water; we agreed to do so. I took my guide by the arm, we propped ourselves with our sticks against the water, and so began our wandering. The water came up to our knees, the big pebbles rolled under us, so that we had to plant our feet carefully at every step. On our right there must have been a waterfall, or something like it, for it was resounding with a deafening roar: we could not see the cause.

Heaven knows what unlucky idea suddenly induced my guide to let go my arm (he was on my right). Enough!

—a movement, a stumble, a cry, and he disappeared. How I got over I can't say. Whether fear and horror gave me unusual strength and safety of tread, whether it was luck, or that the place through which I still had to wade was actually less dangerous, I do not know ; I only know that I scrambled out of the water on to the other bank by clinging to the naked roots, boughs, and bushes, and climbed painfully along the bank, calling out, and feeling with my long alpenstock in the water. Things had gone as I expected : it was a waterfall six or eight feet high over which my guide had fallen. My position was really terrible—tired, wet-through, hungry, a long pitch-dark night with streaming rain, an utterly unknown country before me, and a man's life either lost or in the greatest danger. Besides this the unfortunate guide had my knapsack on his back, in which, as well as linen, &c., were my papers and money. I called out, cried amidst the noise, struck into the wild foaming flood with my alpenstock, and, in short, did everything which despair suggested to me, but in vain.

Exhausted and hoarse, I was about to give up my attempts of rescue, when suddenly I felt my stick grasped ; it went through me like an electric shock. I called out anew, Pull ! and behold, a human form came up from the deep—my guide, who had been senseless, and almost drowned. He had, as it seems, been stopped by some block of rock in the bed of the stream, and had lain there for several minutes (whether with his head above or below the water, he did not know), and been awaked to consciousness by my crying out and pushing. Two dear brothers who have met after years of separation do not embrace each other more heartily than my guide and I. He was bleeding at the back of his head, and could not well stand up from having badly sprained his foot.

After we had sat down to rest, and taken counsel what was to be done (it could not be later than seven in the evening), we stumbled and limped, with torn clothes, tired, and as hungry as wolves, with the firm resolve to seize the first hut we came to for our night's resting-place, with or without the consent of the inhabitants.

Fate was favourable to us. Before long the gable of a house loomed through the darkness, and turning the corner two bright windows shone out to us. Hurrah! land! light! men!

Such adventures may mist cause to the mountain-wanderer.

CHAP. XIV.

CLOUD PICTURES.

MISCHIEVOUS and spiteful as the mist is in the hills, where he has already guided many a sure-footed mountaineer on the road to death, or with ill-natured pleasure has so veiled the lofty points just toilsomely reached by travellers searching for a view, that they have had to return without gaining their object, still, when he is in good humour, or when he leaves the heights to give a turn to the valleys, he can play frolicsome and jovial comedies enough. In the last case, he lays himself down far and wide over field and forest, markets and lanes, and only the mountaineer can escape from his choking miasma-breathing vapours. Then the lover of nature may stand high on the free hill-top in the golden sunshine, and look down on a waving milkwhite sea, from which the neighbouring heights rise up like islands; or, as sometimes happens, when the masses have sunk very deep, the golden cross of a church tower in the valley shines out, solitary, symbolical, and victorious. But far down in the veiled invisible valleys the hum of men murmurs and sounds louder than usual; for mist is an excellent conductor of sound upwards, though just the contrary downwards. This phenomenon, however, may be seen in every mountainous country; it is not a distinctive attribute of the Alps.

More startling and unusual, a genuine phenomenon of the decidedly raised hill country, is that magic appearance which is known in Germany as the spectre of the Brocken, and which not unfrequently shows itself on many high points in the Alps. It is formed by the shadowy reflection of objects and persons on the surface of a cloud rising freely from below, when the rest of the horizon is clear. This phantasmagoria is most frequently to be met with on heights surrounded by inland lakes or marshy hollows, which, under suitable atmospheric conditions, generate light vapours, which rise in the form of clouds. Such points are the Rigi, the Pilatus (which has lately been so often ascended on account of the convenient road and the building of an elegant inn), the Brienzer Rothhorn, &c.

The cantonal forest-inspector, Herr Coaz of Chur, lately observed such a phenomenon under unusual circumstances from the summit of the Piz Curvêr (between the Schamser and Oberhalbsteiner valleys in the Grisons). There had been sudden and violent snowstorms at the end of June, 1843; winter had made a sally against laughing summer, and for some days spread its white tents far and wide over the summit of the Rhætian Alps.

Herr Coaz and the engineers and guides with him had ascended the peak (9158 feet above the sea) under very difficult circumstances, but in a complete calm and in a clear atmosphere, and had soon finished the observations intended for the trigonometrical survey. A wild valley sinking from the foot of Piz Curvêr towards the Oberhalbstein especially attracted their attention. Here there was almost uninterrupted roaring and thundering. One avalanche awoke another, and plunged from the steep rocky side walls into the depths of the valley, where frequently several united, and slowly came to rest in a broad mighty stream of silver. "I never yet had the fortune,"

says Herr Coaz, "on any of my mountain journeys to see this sublime spectacle, so animated and brilliant, with such repeated discharges. I was still following with my eyes one of the last avalanches, which were gradually falling at longer intervals, when I saw a light cloud form above it. Streams of mist too rose from the rocks, against which the vapour-laden atmosphere cooled itself, and, creeping out to each other, soon formed a broad rolling sea of cloud, which concealed the depths of the valley. Nourished by invisible sources, this sea rose constantly higher, swelling up to my feet, and at last rose as a long veil of mist. Among these mixing clouds the colours of the rainbow appeared, at first faintly and passing, but gradually becoming more distinct. They at length united into a brilliant circular band. A second, with somewhat fainter hues, surrounded the first, and was soon concentrically surrounded by another still fainter. The innermost ring appeared to have a diameter of about three feet at a distance of from thirty to forty feet. Charmed at this appearance, I sprang up and stood as though suddenly turned to stone, for behold, in the midst of the rainbow there rose with equal haste a dark figure, which stood still just as stiffly. I waved my hat, made deep bows, and the spectre showed itself equally pleased and courteous. The phenomenon lasted some minutes, and then disappeared with the rainbow into grey mist, which soon dispersed, borne off by a light breath of wind. It was four in the afternoon."

It may be added in explanation that the valley from which the mist rose opened out towards the east. As the sun sank behind the western horizon it sank gradually into shadow, which caused a rapid fall of temperature, and the watery vapour generated by the frequent falls of

avalanches and the high temperature during the day was condensed into mist, which, on rising into the higher strata of air still warmed by the sunlight again dispersed. Herr Kuhn of Dresden speaks (in the stranger's book of Weissbad, in Appenzell) of a similar cloud-picture, exactly corresponding in the principal facts, which he observed on the Ebenalp on the 24th September 1855, after heavy rain. The shadow of his head with his hat floated sharply distinct in the cloudy picture of the shadow, rather above life-size, surrounded by white light. Round it was a dark ring, then a wreath of the brightest prismatic colours, some four ells in diameter. The upper part of the body with his alpenstock was also clearly mirrored, standing upright amongst the colours, but drawn out rather long below. By the side of this *silhouette* stood the dark shadow of his guide. If the last moved a few paces sideways, each could see his picture alone without that of his neighbour. If they shook their heads the whole rainbow circle shook too. The phenomenon lasted a good quarter of an hour.

CHAP. XV.

“WETTERSCHIESSEN.”

AT the head of the Lauterbrunn Valley, where it bend round to take the name “Amertenthal,” there lies high up at the foot of the Jungfrau, and between it and the Ebnefluh, a strange wild snow-covered valley, an hour * in length, the Roththal. From below it is quite invisible, and it seems scarcely credible that there should be an extensive valley where one can scarcely distinguish a ledge on the gigantic mass of the Jungfrau. It is in fact one of the most fearful recesses, not only in the Alps, but in the whole European continent. The walls of granite and limestone which surround the hollow are so torn by the descending glaciers, and eaten out into a gorge so filled with ruins, that the weathered and overhanging masses fill the adventurous traveller with fear and horror.

Difficult of access as it appears when seen from below, it is tolerably easy for practised mountaineers to reach it by ascending the steplike formation of the rocky strata. On the entrance to the valley, some 9300 feet above the sea (or 5000 above the bottom of the Amertenthal), the glacier, which fills the whole gorge, is scarcely 1000 feet

* The distances in the Alps are generally expressed in time—a method which has obvious conveniences in places where a mile may occupy hours of hard work. In ordinarily level country an “hour” may be taken at from two to three miles.

wide. Steeply rising pale banks of granite shut it in like sluices, over which it presses from its quiet bed and precipitates its masses a good 2000 feet, partly in hanging curves, partly in torn, crushed falls of ice, down to the Stufstein Alp. The falling masses of ice are often compared to waterfalls; this otherwise rather lame parallel completely fails here. The chaos of broken lumps of ice, thrown over and wedged into each other, the labyrinth of yawning glaciers which open in every direction amongst them, and the overhanging walls of rock, are so strange that few places of equal wildness can be found in the Alps. If we must stick to the comparison, the Roththal may be compared to an ocean shut in by lofty cliffs, which has been suddenly stiffened in a storm, and whose masses have been pushed over its banks, and piled up in towers of splintered fragments, till they have lost their balance, and huge masses break loose which flow like streams to the valley, crashing as they fall. As not a weed, not even the thinnest stalk of grass, grows here, even the chamois rarely approach it; and as these beasts are not to be found, it happens that chamois-hunters seldom ascend it. The place is consequently only climbed from time to time for their amusement by sheep-boys of the Stufstein Alp.

According to the universal legend in the Bernese Oberland, hobgoblins and evil demons, who haunted human dwellings, were banished during the middle ages, and even after the Reformation, by witch-masters, travelling scholars, and exorcisers, shut up in casks, and transported into this remote valley. Thus the Roththal, which no honourable Christian foot ever trod, came into repute, and was considered as a hold of evil spirits. The old valley-lords of Lauterbrunn in particular were cursed into this place, and pass their existence here.

This legend is in relation to a very remarkable natural phenomenon. It frequently happens in the Swiss middle land, in the cantons of Freiburg, Berne, Solothurn, and Aargau, about midsummer or harvest-time, that a dull sound, like a cannonade, a strange knocking or tolling, is heard by day, or also in the evening or night under a perfectly cloudless sky. According to the popular belief, this proceeds from a spiritual apparition — “the wild hunt,” with which the accursed lords of the Roththal hurry high up through the air. In the belief of the Western Solothurn peasants, they are the spirits of the Burgundians slain at Morat, who make their airy passage with military calls and alarms. In the Bernese Rothenbach, the people say, “The Roththaler are at their exercise, the weather will change.” The intelligent unprejudiced inhabitant ascribes this strange phenomenon to natural causes, and believes that they are to be sought for in actual military exercises at a distance, or in remarkable falls of avalanches or thunderstorms, whose sound in particular sets of the wind may be borne to the ear of the hearer. Many and extended investigations have however now shown that throughout a great circuit no military fire or cannonade nor discharge of thunder has taken place. The roar of avalanches, again, loud as it may be in the mountains, can scarcely be heard eighteen leagues off. Assuming that the thunder of an avalanche could be perceived so far in a favourable direction of the wind and in a very pure air, so many avalanches do not fall in succession that their sound could be heard for hours together with few interruptions. Moreover, the phenomenon occurs less frequently near to the Alps, and often takes place with a north-west wind. The meteorologist Hugi, in Solothurn, who has paid much attention to the question and often observed it, says that the sound

has no appearance of proceeding from the Alps, but rather from the west or the Jura, where of course there are no glaciers nor summer avalanches.

It is a fact that after this phenomenon, called "Wetterschiessen" (weather-shooting) by the people, a soft steady rain often begins, accompanied by electrical phenomena, and the barometer is unsteady.

Its exact cause has not yet been determined. Strangely enough, no natural philosopher except Professor Hugi has inquired into it. He considers that this dull wetterschiessen is proximately an effect of the passage of atmospheric forms into denser, more watery and vaporous forms, or the effect of a disturbance of the air ; and hence, as in all disturbance, noise. According to this, it would be the inverse of the so-called Wetterleuchten (summer lightning), in which the saturated vapours of the atmosphere pass into thinner, purer forms by the loss of electricity. It is striking that the phenomenon only occurs in the district mentioned, never close to the Alps.

CHAP. XVI.

THUNDERSTORMS.

A THUNDERSTORM, wherever it occurs, whether on the extensive levels of the wheat-lands, or the barren heath, on the open sea, or the splintered mountains, is everywhere a fearful spectacle. Everywhere there is the same uproar of the elements to excite our horror, the same thrilling giant's voice of the thunder that makes our souls tremble. The natural scenery and the forms of the landscape in which the thunderstorm is discharged, give it very different characteristic forms, and vary its immediate impression. This is the case especially with thunderstorms in the mountains.

Although hill and forest are notoriously favourable to the formation of clouds, they rarely appear in the Alps as those seas of vapour, laden with electricity, and covering many square miles at once, which every summer hang over the low countries. The lofty mountain-ridges form barriers which cut up the thunderstorms into many small clouds, and thus cause them to be generally of short duration, and also of less intensity than in the lowlands or on the open sea. The rapid cooling of certain strata of the atmosphere under rapid changes of temperature, and their efforts to find their level by the draughts of wind, which may be regarded as the natural ventilators of the valleys, generally bear the thunder-

laden clouds pretty quickly through one mountain-district, so that the sum of the electric discharges in the mountains, which last only a very short time, is at least three times as great as that of the storms which work themselves out steadily, and at their ease. This is the normal state of things, which does not, however, exclude the existence of particular colossal storms, which extend their destructive cloudy curtain over whole regions of the Alpine lands at once. The most striking case lately is the celebrated storm of the 24th of June 1859, which interrupted the battle of Solferino, and at the same time raged with unexampled fury in all the districts of the Swiss and Savoy Alps. Not less memorable is the older one of the 27th of August 1837, which, drawing up from the south-west, ravaged the whole canton of Grisons and many neighbouring districts, a surface, at the least, of several hundred square miles.

On the other hand, mountain thunderstorms, considered as individual meteoric phenomena, are far more sublime and imposing, one might almost say more theatrical and more striking in their effects of sound and power, than in the lowlands. The introduction to one of them is far more dramatic and exciting to the expectations than in the plains. There (in the plains) the thunderstorm is often preparing for hours with solemn and awful repose, and leaves plenty of time to the observer of nature to watch on the broad horizon the gradual formation and conglomeration of the various contingents of clouds which at length form one massive black wall. There it is a majestic beginning, full of awful sublimity. Here, in the mountains, where the view towards the valley is generally cut off by an unimportant outlier, the mysterious guest generally enters, formed and ready, from the plains, and presses on with stormy steps. Now the landscape

begins to receive strange and splendid ornaments. The pine-forests sink into black night, no single point stands out independently by itself. The groups of rocks lose their decisive contours, and melt into spectral-grey shapeless masses, over which the waterfall hastens down with a strange hurry, like the bewildered leaps of a madman's thoughts. The lake lies dead, without a glitter, like a dull, frozen level. The illumination which disappears there, accumulates dazzlingly, almost blinding the eyes elsewhere. The meadows in the foreground swell into a burning green, as though they would all at once pour forth their innermost power of life; the paths and roads of the valley stand out in unusual sharpness of a pale yellow; and above all the snows shine down a bright white, fearful contrasts to the dull, dismally hued picture. All harmony of colour has left the landscape; it looks like a painting formed by a morbid, heated fancy, scorning all natural connection. The feverish excitement which comes upon men and beasts is in ominous contrast to this terrible scenery. The hay lying on the meadow is hastily gathered; the herdsman drives his cattle together with loud cries; jodels grow dumb; hurried employment is the characteristic expression of life. The mountain crows high up swarm screaming round their rocky nests; swifts and martins have vanished; the song of the forest birds is still, only the finch cries unceasingly for the rain.

Now the herald of the thunder, the wind, sounds its first notes, whirls the rustling dust, and shakes the forest with its strong hand; the lake awakes; a shivering shudder runs over its countenance; thick caps of cloud envelope the high points and glacier-covered giant heads of the mountains; the masses of cloud sink lower, and drive like a wild hunt, with increasing haste through

the valley; the country gets darker and darker; the dazzling colours grow dim — all becomes black. Then the first blue flash leaps through the night; the activity of the atmosphere becomes steadily greater.

The forests creak under the storm; torn leaves flutter through the air, and a universal heavy murmur sounds all round. Now too the deep roar of the thunder chimes in. But this prelude does not last long. Energetic as the Alpine world is in all its phenomena and signs of life, this development proceeds in a startling progress. In a few minutes the storm has broken forth in its whole fearfully wild force.

Zigzag lightnings, far more than are seen in the lowlands, lasting certainly less than the thousandth part of a second, flicker round the mountain's loins, often gathered together, and shooting out in every direction from one centre, like the bundle of lightnings from the hand of Jupiter; the rolling of the thunder, which finds room enough for its sound in the chambers of the clouds, roars besides, as reflected in a hundred voiced echoes from the rock clefts and valleys, and forms a grand tone in its unceasing permanence, on which the new accented solo strokes are relieved like the progressive melody of the imposing storm symphony. It is an act of nature's sovereignty, whose impression is overwhelming upon all who witness it. If it then strikes a wetter-tanne or solitary chalet, the valley cracks as if the rocks all round were about to burst into a thousand shivers.

Such is a weak sketch of a high thunderstorm. They rise in the Alps to above 15,000 feet; for De Saussure saw them on the Dôme de Gouté below Mont Blanc, and the inhabitants of Zermatt observe them discharging above the top of the Matterhorn. In the west of Mexico, Alex. von Humboldt saw traces of lightning on the highest

point of the Toluca, at 15,750 feet. In the Peruvian Cordillera a thunderstorm surprised the travellers Bouguer and La Condamine on the Pichincha, at a height of 16,500 feet, and many credible accounts say that in the Pyrenees they rage at 10,000 feet and upwards.

Most thunderstorms, however, descend lower in the mountains; their ærial region lies from two to three thousand feet above the floor of the valley. A thousand stories in the Alps show that they sometimes sink much deeper. It is an established fact that in the storm which, on the 26th of August 1826, killed two priests during vespers in the monastery of Admont, in Austria, the cross of the tower, which is 114 feet high, rose above the clouds, and the storm itself was only some 90 feet above the ground. Such deep lying storms give occasion in another way for a majestic spectacle, the sight of which makes one reflect on the limits of earthly frailness and human weakness, that is, the discharge of a thunderstorm in a valley when one is in the Alpine region far above it. The traveller stands like a Jupiter Tonans on the heights of Olympus; below him is couched a dark grey monster, the threatening sea of cloud; laden with electricity, it creeps like a gigantic serpent round the mountains. No house or chalet can be distinguished below; all that reminds one of the dwellings of the living is sunk in grisly night. But far up the great features of the mountains stand out in full relief; the thunder builds, as it were, a bridge from one to the other. There is a movement at our feet, the pale rose-coloured fiery serpents of the lightning shine in crooked intersecting paths through the awful veil which hangs above the landscape. Now there is a crash from below, powerful though dulled, and with a hundredfold echo, the growls from the valleys repeat it, till the tones of horror die faintly away. The

terribly beautiful sight is incessantly repeated, the lightning licks and fires the valley with its fiery tongues, and the thousand-voiced anger of the thunder is constantly sounding. The wanderer stands on the heights, "looking over wasted lands." Peace and lovely stillness surround him. The great edifice of heaven is vaulted in transparent clearness above his head, and the sun radiates light triumphant over darkness, imparting life and warmth in everlasting purity. Still nobler is the spectacle by night. The strangers who passed the night of the 27th of June 1860 on Pilatus, can find no words to describe the unspeakable splendour of the fearful thunderstorm which, from two till three in the morning, made a perfect sea of fireworks beneath their feet; whilst, above their heads, the starry tent of the mighty heavens rose pure and lofty in its quiet sublimity. All inhabitants of the mountains agree that the lightning frequently strikes upwards from below. The peculiar glazing of many rocks is ascribed to these electric meteors, as, for example, on the Dôme de Gouté, the Kaerpfstock (Glarus), the Ortler Spitz, the Venediger Spitz, and the Ankogl (Corinthia). Such lightning scars may also be seen on the Pic du Midi and the Mont Perdu (in the Pyrenees). An accident in Styria shows that such strokes of lightning may kill men. The church of St. Ursula stands on a lofty hill. On the 1st of May 1700 this house of God lay in full sunlight, whilst a dense thunderstorm was raging half way up the hill. Seven of the persons praying in the church were struck by the side of the narrator, Dr. Werloschnigg.

Precisely where the danger would appear to be greatest—in the thunderstorm itself,—it seems to be least, or, at any rate, not greater than elsewhere. Engineers and travellers, who have been accidentally enveloped in thunder-clouds, before they had time to escape from the awful

lightning-armed mystery, have always escaped without injury. Thus the French captains Peytier and Hossard, who were thirteen times, during the years 1816 and 1825-27, delayed for hours in the very focus of fearful storms in the mountains of Troumouse, Pic d'Anie, Pic Lestibète, and Pic de Baletouse, were never in the least injured, though they had been given up for lost in the valleys. They say that their hair and the tassels on their caps stood on end. Abbé Richard, who, in order to study the effect, intentionally penetrated into the midst of a stormy thunder-cloud, could no longer hear the fearful peals of thunder, but only a noise like an incessant rattling of nuts. On the contrary, the geologist, Professor Theobald, of Chur, who was in the Solferino storm, between the Tschierscher and Urden Alp, in the electric clouds, says that the peals were short, like cannon shots, but of a clearer, more cracking tone, and that the rolling of the thunder was only heard further on. We shall speak of the general consequences of thunderstorms in the Alps in the description of the "Rufenen."

CHAP. XVII.

WATERFALLS.

THE Fall of the Staubbach, in the Lauterbrunnen Valley, which has been a hundred times described and drawn, besung and bepraised, and mentioned in every handbook of geography, so that every schoolboy knows its name; is the noblest representative of that extensive tribe of waterfalls, which owing to their extraordinary height of their fall seem quite to evaporate, till they reach the new stream-bed in the valley. Owing to this circumstance it undergoes more Proteus-like changes than most others, and displays such wonderful metamorphoses at different times of the day and year, that it continually seems to be changing into something different, and therefore has to submit to the most various and contradictory criticisms.

It is also subject more than any other waterfall to those natural processes which enlarge the volume of water, and thus increase the weight of the fall, or, on the contrary, diminish it so much that the spectacle of the rush of water over a cliff of 800 feet becomes almost insignificant. After long continuous rain, violent thunderstorms, or in the early summer, when the snow is leaving the Alps, the Staubbach and its many companions which resemble it in form in different parts of the Alps present imposing, nay, almost fearful phenomena, which cannot fail to make a deep impression on the spectator. On the

other hand, in the summer, after weeks of drought, it frequently happens that instead of the celebrated Staubbach fall, nothing but the lofty damp wall of rock is to be seen, over which, at other times, the watery veil shoots down ; not a trace of the true waterfall can be discovered. Besides these circumstances, which affect the existence of the waterfall in general, others must be taken into account, even when there is plenty of water. The time of day at which the fall is seen is not unimportant. In the shadow of the afternoon it is far from appearing so full and rich, as in the morning when the sun's rays shine through every drop of water, and cause the thousands of sparkling particles in the watery dust to glance with a brilliancy and splendour, which are extraordinary in their way. The pale feeble moonlight works another, though similar charm, upon the waving veil as it swings from the rocky wall.

Much again depends upon the state of mind and the expectations with which the traveller comes to the Staubbach. He who has lately seen the thundering cataract of the Rhine at Schaffhausen, of the Aar at the Handeck, of the Buffalora in the Val Misocco and other mountain streams which foam down in vast compressed volume through narrow channels, and is still shuddering at their power, if he enters the Lauterbrunnen valley and expects something similar will certainly be disappointed. The Staubbach, except at a few moments, is a phenomenon of a tender elegiac nature, which should produce rather emotion than astonishment and wonder.

Two branches of a stream leap out at a height of near 900 feet, over the vertical cliffs, and unite to form a moving pillar of water, only a small part of which strikes against a ledge ; all the rest dissolves in free air into

millions of pearls, and at last thins out into a shining rain-like dust which partly wets the meadows for a considerable distance round with an everlasting dew: partly collects again into a deep basin, in which shining rainbows are interwoven with each other. The Staubbach is not made great by an irrestrainable wild stream, which foams over picturesquely fissured masses of rock, and is broken into manifold forms, or which shakes the air by the thunder of its fall and compels exclamation of astonishment. It derives its nobility from its height of fall, from the masses of water which press the cliff in unceasing procession as white and soft as milk; from its continual melting into mist, and the play of its rainbows; but especially from its gentle tender murmur harmonising so marvellously with the softness of the whole scene, and not arising from one place, but playing all round the spectator like spiritual voices. Hence arise the objections which artists make to this natural beauty. The fall by itself gives them too little opportunity for picturesque interruptions. The gentle successive motion of the masses becomes rigid stillness on the canvas, and neither the gleam of the water nor the magic play of the rainbow can be so rendered in a picture as to appear artistically beautiful and transparent.

The first condition to a full enjoyment of its beauty is sunlight: on the longest summer days this lasts from seven in the morning till noon, when it is withdrawn from the stream by the same mountain over whose lower terraces it falls. Not only the rainbow over the basin in which the fallen water collects, but also the flying watery flakes in the air have need of sunshine. Every grain of dust becomes visible in it, and the contents of the cloudy column appear twice as great when the favour of the king of day is poured straight upon it. The shadow of the fall on the cliff is at the same time delightful; it looks

like a second stream, of Stygian blackness, hurrying down with emulative speed.

People generally go to the place where the brook falls in rain to the earth, as though they wished to feel it before they looked quietly at it. It is a basin where the sightseers love to stand. The people climb the hill of *débris*, which the stream has formed for itself on its left bank, and look down into a wide hollow that quivers unceasingly in the thousand-fold spray. On the opposite side too lie heaps of fragments, which have been cast down from above, and between these two bulwarks the whole stream rushes in its free passage. It is plain that the depth of the basin and this opening towards the *Lütschine* are owing to the masses of water which, after thunderstorms and during the melting of the snow, have here made room in the centre of the fall, without diminishing the hill on the right or left, for these have been built up of all kinds of stones, to dam up the commencement of the bed of the stream with all their might.

It is easy to descend into the basin on the right hand. We are immediately surrounded by a double rainbow, which, like a saint's nimbus, stays close by us, and moves backwards and forwards step for step as long as we stay in the sunshine and the cloud of spray. The drops of water hang to our clothes, and shine separately with incomparable splendour. But the dampness prevents us from long enjoying this fairy-like dress; a frosty sensation drives us soon up to the bank, all the sooner because it is just possible that some stone shot down may accidentally wound us, and inflict even fatal injuries.

We may then lie down on the meadow grass in safety, and enjoy at our ease what had previously escaped us. We raise our eyes in unwearied astonishment towards the lofty dark-grey cornice, sharply relieved against the blue

sky, from which the Naiad hangs her two-fold flying garment in the air. One half of the brook, almost imperceptibly divided from the other, hangs almost vertically downwards, and would slide insignificantly down the rock wall, were it not that the cliffs retreat from the brow till about half way down, so as to give the pillar of water free space in the air. The lower half again of the mountain wall projects decidedly, and now crushes the mass into that steam and spray which wavers down in such ærial and vaporous forms, reminding one of the fall in the Salzburg Alps, to which the people have given the significant name of "Schleierfall" (Veil-fall). The interior part of the Staubbach falls half way down, as if it were trying to stop against a projecting rocky ledge, and from thence gushes downwards in thousands of bright foam-flakes, entirely on the dark rocks into the basin, whilst the exterior part, pressing the air beneath it by its swiftness and weight, expands in millions of bubbles, and sprinkles an everlasting dew far round on the earth.

It is interesting to follow the water from its streaming out over the lofty rock ledge to its crash at the foot of the cliffs. It bursts forth so furiously that one might be frightened at its fearful fall; but after scarcely one hundred feet, it spreads out richly. The compressed column expands into solitary snow-white cloudlets, which might be called water rockets, as, like those flaming heads of fire, they leave a tail behind, which marks their path for half a second, until they are completely scattered into water-sparks, and lost to sight. The varying play of the wind is lovely on the Staubbach. The water, by the weight of its fall produces a considerable draught of air; but this motion only scatters abroad the fine bubbles, and does not affect the whole mass. Whenever a gust of wind attacks the rush of water, strange and startling phenomena are

produced. It often happens, when the Föhn* presses vehemently against the outlet of the stream, that the water is completely repressed, and sometimes not a drop falls over the cliff for two minutes together. At other times the draught of air tears whole troops of transparent cloudlets from the wavering mist of vapour, and produces charming effects. But the most curious sight is when a violent storm seizes the whole brook, and so completely bends it on one side during its airy leap, either up or down the valley, that the water-course below is quite emptied—the little stock in the basin empties itself into the Lütschine, and the quantities of frightened little fishes, surprised in their sport, can only find the moisture necessary for their existence in a few little hollows in the bed of the stream. Troops of merry children hasten up the stream at such times, and busily catch the helpless trout, from the holes where they are splashing about, with tubs and pails. In the midst of their plunder the wind ceases above, the brook regains its ancient bed, and the frightened fish spring like arrows from the hands of the children, whilst the courageous fishers, wet up to their knees, spring hastily on shore to wait for a repetition of the ebb.

Such are the metamorphoses of the Staubbach in summer and good weather. The winter, the spring, and seasons of violent rain can show others equally worth seeing.

In winter, when the snow falls, the flakes hang on to the lower side of the Staubbach wall, freeze in the increasing cold as they are saturated by the water above them, and form curiously shaped icicles of all sizes. A brilliant gleam, quite blinding in sunshine, fills the eye,

* The warm southerly wind.

and the mountain seems as if it had been glazed with clear blue transparent glass. If milder weather comes on, or the warm Föhn dissolves the winter bands of ice, great pieces of these shapeless icicles fall with a crash to the bottom. The mass of ruins accumulates in the basin, towers up into a hill of splinters, and forms a miniature glacier with its whole configuration, by the cold drops of water which spurt over it, and are quickly frozen in the chilly nights. The drops, indeed, are frequently frozen as they fall when it is bitterly cold, and coming to the earth show experimentally before our eyes the formation of hail. Close to the cliff, at the point where the divided brook falls, there generally grow two huge pillars of ice, according to the laws of architecture prevailing in fairy land, where pillars and castles are constructed in the air. If they suddenly give way, either from their own weight or being undermined by the warm south wind, they crash with such vehemence on the glacier in the basin, that everything round trembles as though from an earthquake. It is most striking when both pillars fall at once, and it is curious to observe their new formation as soon as new frosts occur. But as the warm air gains power in the spring, especially towards May, the heap of ice in the basin melts visibly, and dissolves in the first place, as in the glaciers, close to the rock, so that a huge chasm yawns between the ice and the stone, often near seventy feet deep. Remains of the winter frosts often maintain their position half through June. A beautiful azure portal is often formed, through which the melting water flows, just as in glaciers; or the falling water, owing to its greater warmth, bores a vertical shaft, which pierces through the ice. Here again the sun's rays form magic effects of colour, incomparable in their way.

This peaceful and harmless aspect of the brook is in

striking contrast to its fury when storms are breaking over the heights of the Pletschberg.

Roaring, swollen, and stained black with mud, the stream shoots down in two thick branches, as though out of monstrous fountain-spouts, from the edge of the lofty wall which now rises straight into the growling thunder clouds. The unchained stream bears with it a burden of stones, some of them weighing over a hundred-weight, and slings them down into the valley like a gigantic black hail. Jumping from the ledges of the cliff, they repeat their bounds, till at length they crash into the basin of débris. The reciprocal friction, the electric shock of the stones, heats them so that a sulphurous odour is diffused round them. Then down come stems of trees, uprooted pines, in the swollen waters. According to their weight or size, some of them are caught by eddies of the wind, and, whirling round like the shingles off an unroofed house, sink slowly to the ground. Others are shot out like gigantic arrows, and pierce deep into the ground. The usually gentle, wavering sheet of water, looks like an inverted dark-brown column of smoke, whose volumes and waves extend the more the nearer it gets to the ground. It is often carried away by a gust of wind, and struck far out of its vertical path to fall higher up or down the valley; or it scatters itself right over the whole breadth of the valley towards the opposing cliffs of the lofty Schiltwaldfluh. It even happens at times that the thick mud stream is driven back like whirling smoke, and after having been beaten backwards towards its source, begins its foaming fall anew, whilst for a second the bare rock appears, with the continuous hail of stones, as an independent and terrible phenomenon. The black, heavy overhanging curtain of clouds, which conceals the narrow strip of sky that looks down between the lofty rock walls,

the yellow fire of the lightning that searches along the floor of the valley or the heights of the cliffs, and the fearful rolling of the rattling shattering thunder, are an awful but noble accompaniment to the raging torrent. A scene from the closing drama of the last judgment appears to be realised when such a storm breaks over the valley, and it needs the stoic calmness which the mountaineer gains in his daily battle with the elements not to lose one's presence of mind, and to be overwhelmed in contemplating the attack which seems to be threatening the valley with inundation.

Let us finish this description of an Alpine waterfall, which offers inexhaustable materials, with a picture of its quiet gentle appearance in the pale light of the moon. When the sun is lost behind the mountains, long strips of dark shadow are produced by the various sharp points along the rock wall, which seem to cut the column of water into separate portions, and make the part of it which is in shadow invisible. When the clear sunlight has quite disappeared from the air, a deathlike paleness spreads along the cliffs : the abundance of water seems to dry up, and a mere insignificant stream to be trickling over the cliffs. As night comes on, the solitude of the majestic fall and its motion disappear more and more. Only a white giant figure, a ghastly pale misty form, leaning in its long folded, stiffly-hanging mantle against the cliffs, still rises above the silent houses couched in the darkness. But this strange transition period does not last long ; life soon returns to the form. Above the everlasting snow-peak of the Jungfrau, rises "the pale friend of need and night, the magic scene-painter of the future world, for which we burn and weep"—the moon—and pours its mysterious light over the Alps. Then not only the pillar of foam shines in its pure silvery light, but the watery rays on the

lowest slope of the cliff change to a rain of brilliants, which, in its pale play of colours, strives to imitate the enchanting magic of the day; the diamond sparks waver like spirits round the dreamer who betakes himself there by night.

The full mountain stream, with mighty waters, when interrupted in his course by a staircase of rock, or a lofty almost vertical fault in the strata, and compelled to a desperate leap into the abyss, offers quite a different picture. This is the proper waterfall in the more narrow and precise sense. What is an embodied idyl in the gently sinking "dust"-falls, easily wavering and borne aside by the wind, which murmurs its spiritual whisper like a tender adagio, becomes an energetic expression of strength in the huge full-bodied waterfall, a powerful tragic catastrophe in thundering furioso. The first are of tender feminine appearance, which sink with powerless yielding before that which is unavoidable; the last show the vigorous actions of manly impulse, which may be compared to the fiery courage of a people driven to show its independence and coherence by its last desperate efforts of self-defence.

From their hardy, stubborn bearing, they naturally produce landscape effects of more lively and picturesque character, with more varied forms, according to the architecture of the rocks over which the water is hurled. Much depends upon the capacity of the rock for weathering, and its characteristic forms of fracture. Where granite, or, generally, crystalline rocks are the basis of the cliffs, and the consistency and endurance is therefore considerable, the waterfall is a sublime and massive spectacle. But even here there are great varieties. The Buffalora in the Val Misocco (Grisons), which comes down over an almost vertical wall, shoots out above in a close compact column, like a crystalline cannon-shot, over the rim of the cliffs,

and arrives at the bottom in a round consistent body, without touching the gneiss cliff over which it falls. In the circumstances of its fall it is much like the Staubbach, only that, in consequence of the greater volume of water and the inferior height of the fall, it does not scatter so far in its leap, but comes down in nearly the same dimensions as at its origin. It is the bold masculine pendant to the feminine Staubbach.

The ricochetting falls belong to the same category. The Piumegna, at Faido, comes over the Alpine terraces of Pian del Lago (which form the western wall of the Ticino valley of Leventina) in little cascades, as a lively well-nourished mountain stream, and suddenly finds that it has no bed left, but has to take a jump into indefinite space over the vertical wall of mica, trusting to its luck. It leaps, strikes the bottom, but instead of falling into a basin to collect its foaming waves, falls on to a platform of rock, so as to spurt up again in picturesque confusion, like a fountain of fans, and makes a bound into the free air, which resembles a plume of marabout feathers. It is the same in the Cascade des Pèlerins*, which leaps 150 feet, as the outlet of the glacier of the same name in the valley of Chamouni, and rising up again with elastic power seeks a way out.

Those again have a very different appearance which do not properly leave the bed of the stream, but have to leap down steps in it of more or less height. The most imposing of this tribe is the celebrated fall of the Tosa, in the Val Formazza in Piedmont. As being (after the Rhine falls at Schaffhausen) the fullest of water, it produces the wildest spectacle in its granite bed. The Tosa falls in a

* See the account of the partial destruction of this fall in Mr. Ruskin's "Modern Painters."

breadth of more than 80 feet, over an aggregate height of 400, spreading out below, in three leaps, and dissolves its masses of water into boiling waves of foam, from which a dense watery steam is constantly rising. By its side, as still wilder in the surrounding scenery, though not of such abundance of water, we may place the Handeck falls of the Aar in the Hasli-thal. It falls in a granite cleft more than 200 feet deep, and through the first half of the cataract in a united, smooth, glistening mass; but it is afterwards crushed against projecting points of rock, which appear indestructible, so fearfully that it dissolves throughout into snow-white bursting hemispheres, and in this state boils down from step to step. Still more sublime, as far as depends upon the surrounding decorations of rock, are the Bérard or Payaz falls near Valorsine on the Tête Noire. The approach to them prepares one of itself for something extraordinary. A wooden bridge, about thirty feet long, spans the entrance of a rocky gorge, from the depths of which there resounds an undefined murmur. Leaning against the lofty walls of rock, are scattered colossal blocks of granite heaped wildly over each other, and forming a natural tunnel by their closely piled masses. The path then goes up and down over a well-made stone staircase, through two successive caves, then over a rather level piece of ground, grown over with fir trees, where Alpine roses still please the eye; then through a third still longer and quite dark granite passage perhaps fifty paces deep, and finally over a solid wooden bridge to the daylight. Then the traveller stands suddenly beneath the noble waterfall, most of which leaps over a mighty slab of smooth granite, some fifty feet above the spectator, into an awful depth of about 250 feet, with a fearful crash. A little arm of water winds round to the right of the granite, and

unites itself a little further down with the principal mass, so that the view has some resemblance to that of the Handeck, where the Aerenbach plunges into the foaming Aar. The special peculiarity of this waterfall is its absolute isolation, and the grand framework of dark Stygian masses of rock, whose ends have been as sharply hollowed out, pointed, and modelled by the tooth of time, as if the cleverest stonemasons had been elaborating their masterpiece to adorn some Gothic building. This fall might well be called, from its framing, "the Gothic fall," as the hundreds of rising pillars have quite the character and design of a noble middle-age cathedral. Neither the Glommen and Brammen falls in Norway, nor those on the Styrian border in Tyrol and Switzerland, can produce a side-piece to this fall, which in its way is unique.

From this fall downwards, we might make a complete scale of the Alpine waterfalls in the region of granite rocks. We will only mention two as special representatives of the various formations. One is the fall of the Hinterrhein in the Roffla (between the Via Mala and Splügen in the Grisons), the foundation rocks of which sink in the form of a steep staircase, and thus offer perhaps the most characteristic example of the steep cascade in the river-bed; the other is the fall of the Reuss under the Devil's Bridge in the St. Gothard, which represents the more gradually inclined form of cascade. The Fressinone, at the opening of the Gondo gallery on the Simplon, may be taken as the model of a uniform step-formed cascade.

In the midst of these are to be placed the ornamental waterfalls. The best of these is the Pissevache in the lower valley of the Rhône. The angular terrace-shaped structure of the mass of rock over which the Sallenche stretches its arch, with its woolly rounded masses, and

the accompanying falls which surround the chief mass, splashing, hopping or rushing down in wild haste in countless arrows, form such a many-sided moving picture, that, if the Pissevache had the rich accompaniments of the Giessbach on the Lake of Brienz, it would be the most varied fall in the Alps. The falls of the Schmadribach at the bottom of the Amertenthal belong to the same group according to our arrangement, and are yet extremely different from those above described. The central glacier stream comes down full and foaming in the centre, forming a real waterfall over the black split masses of rock, pale and barren, with the mighty ice pyramids of the Grosshorn, Breithorn, and Tschingel-horn immediately above. A number of small threads of water splash and hop round this chief stream down the granite staircase, some in long trailing forms, some crushed against corners, so that one becomes quite bewildered by the crowded confusion, from whose bosom the rushing roaring *mêlée* shoots out diverging milkwhite flakes of foam, to unite them again the next instant. At the foot, as at the centre of an opened fan, the scattered shoots of water gather into a full stream, and, as soon as they are united, dash down the rocks in an overwhelming hurry between the steep rock-gates, again to give the reins to their overflowing youthful spirits in the smaller falls below.

The system of cascades is repeated at a great interval by the waterfalls of the limestone Alps. There the change of strata, and the variously inclined elevation of deposits and the steps at the end of layers, produce a natural staircase in the river-beds of the outlying mountains, which is most strikingly displayed in the celebrated Giessbach on the Lake of Brienz. It happens to fall in a remarkably convenient situation. A comfortable inn has been built close to one of the falls, and during the

summer Bengal lights are placed behind the water several times every week, which turn the fall into a transparent stream of fire, and is thus a mark for all tourists. Still grander are the Reichenbach falls between Meyringen and Rosenlauri; they unite models of all the forms hitherto described, though of course without their overwhelming sublimity.

We must call to mind still one other kind of waterfall which, to a great extent, is less frequent in the hills than at their foot—the rapids. Their name implies that they are not so much real falls, as swift steep volumes of water falling over the gigantic weirs built by nature. The most celebrated rapid is the Rhine fall at Schaffhausen, which has been painted and described often enough to make a description from us unnecessary. Something like it may be found in other Alpine rivers, as at the fall of the Inn, where it leaves the Lake of St. Maurice in the Upper Engadine. Rapids in the more special sense, in which the stream receives an impulse from the steeper inclination of its bed, and hastens over a flat plateau, are to be found in every mountain-stream, so soon as it leaves the region of sedimentary formations. Such rapids are the causes of many streams not being navigable.

At Laufenburg, on the frontiers of Switzerland and Bavaria, firm Alpine gneiss crosses the bed of the Rhine like a dam, and compels it to hurry down between huge blocks over steeply inclined beds of the crystalline rock. As the masses, notwithstanding their roar and their foam, have quite lost the true character of the waterfall, as the surface of the stream remains tolerably smooth, though with considerable waves, foolhardy people, playing at hazard with their lives, have often ventured to cross with small boats fitted for the purpose. Some have succeeded in their mad undertaking, others have pe-

rished. A young Lord Montague was one of the last, who, strangely enough, lost his life in this way on the same day on which his ancestral castle was burnt in England. The boatman with him saved himself. Experienced boatmen can cross without danger. A rapid is formed still more definitely at the so-called "Kleines Laufern" near Coblenz, a few hours above Laufenburg.

CHAP. XVIII.

MOUNTAIN SNOWSTORMS.

SNOWSTORMS are some of the wildest and most fearful phenomena of the high Alps. No one can form a lively picture of the vehemence, power, and density of the snowstorms,—which make it possible for a road quite visible a few minutes before to be completely buried and covered a foot deep in snow,—who has not already witnessed the wild manifestations of the strength of the elements in the high Alps. The snowstorm in the Alps is the opposite pole to another equally terrible atmospheric phenomenon, the simoom of the desert. As the burning blast of the desert wind raises incalculable millions of hot glowing grains of sand, and bears them hurrying through the air, scooping deep hollows in one place to deposit new hills as high as houses in another ; so the snowstorm fills the air for great distances with thick clouds of small snow-crystals, darkening everything, penetrating everywhere, seeming to form one melting mass with the atmosphere. The relationship of the mechanical activity of these two natural phenomena is remarkable, and shows a parallel up to the smallest details, although under conditions of the greatest contrasts in temperature.

The snow of the high Alps is, both in figure and contents, and in the density and specific gravity of its particles, generally very different from snow in the low-

lands. Although it may arise under similar conditions, still the process of formation is very probably simpler; it is a question whether it may not consist of those elementary bodies by the conglomeration of which, according to certain laws, the snow-flake, as generally known in the valleys, is constructed. For natural science has not as yet penetrated far into the secrets of snow-crystallisation: it can only offer suspicions and grounds of probability as to the questions in what region and under what meteorological influence the first formation of snow begins; and it is still an undecided question whether the symmetrical snow-star, which always presents itself in the triangular hexagonal or six-edged form, arises from the addition of small, indefinitely fine, but still perfect needles of ice, or whether it constructs its invariable form, beginning from its centre, by the adhesion and consequent freezing of the bubbles of water hanging in the form of vapour in the atmosphere. The two kinds of snow, high snow and the flaky snow, have about the same relation to each other as that which the chemical contents and specific gravity of the heavy lowland air, saturated with many particles of matter, present to the fine, thin, light, and pure mountain air, which becomes more volatilised the higher one rises.

The great, broad, fat flake of the lowlands is a union of many more or less completely formed stars of ice crystallised in surfaces, which,—as the weight of the particles of water contained in them has for the space occupied no proportion to the air displaced,—flutters slowly downwards like a parachute moved by the wind; and receives a greater velocity when it sinks to strata of temperature which, by their greater warmth, partly dissolve the frost-bound atoms of water and saturate the mass.

The high snow is quite different. At the first glance, we can see its entirely different formation. It is far finer, more like meal or sand, dryer and therefore more capable of independent motion. Under the microscope it shows in parts merely prism-shaped needles, or indefinitely fine, but compact and wedge-shaped hexagonal pyramids; in other parts it presents itself under an approximately spherical shape, showing a bullet-shaped central body, round which little points shoot out in all directions, like the weapon of the middle ages known as the "morning star." It is clear that such a body of small circumference, and most likely of comparatively denser and therefore heavier composition, will cut through the air with far greater velocity, and thus be more capable of motion when the wind drives it, than the net-like, broad, and capacious snowflake.

In consequence of its fineness, the high snow defines objects upon which it falls with more accuracy, draws their contours with more detail, and conforms itself to the smallest shapes with remarkable pliability, as it were only covering objects with dust, when the fat, downy lowland flake covers them with great heavy lines. These subtle sprinklings are only to be observed in autumn, on weeds, withered husks, and the small tender cryptogamous Alpine plants, when the atmosphere makes its first attempts at dusting them over with instantaneously frozen snow. This light snow is not to be confounded with the allied phenomenon, which occurs equally in the hill and plain countries, of the hoarfrost, which covers stones, plants, and other objects with crystals, when a mist is covering a landscape and the temperature is below freezing.

It is not to be maintained, however, that the flaky snow is under all circumstances impossible in the high Alps.

The well-known Swiss mountain-climber, Herr Weilenmann, assures us that on his ascent of the Grand Combin on the 10th of August, 1858, at a height of about 12,000 feet above the sea, and at a temperature of 6° ($=43^{\circ}$ Fahrenheit), he was surrounded by a dense snowstorm of the thickest, heaviest flakes.

Next to the remarkable fineness of the individual particles of the high snow, we must observe the great dryness which distinguishes them. This is the consequence of the almost uninterrupted low temperature which prevails during the whole year in the higher regions. In its normal state the high snow is so hard, so decidedly formed, that it cannot be "caked" without a powerful application of warmth, any more than a handful of dry sand.

With this material the wind plays its fantastic game on the heights and ridges of the mountains, which rise above 5000 feet. It suddenly clutches several hundred thousand cubic yards of this fine ice-dust, whirls it high up into the air in its play, and there leaves it to the prevailing course of the wind, to be shot down where it pleases in the form of a dense fall of snow, or scattered in glittering needles of ice. The people say in Chamouny "*le Montblanc fume sa pipe*," when the snow rises like smoke through the clear dark blue sky from the snowy cupola of the highest of European mountains, and is puffed lightly away. Or the wind, as it stirs the wastes of *névé* with its fan, raises a load of the dry mountain snow that does not seem to it to be lying in its proper place, and slings it carelessly into the deep hollows and depressions of the ridges, building in a few minutes dams and fortifications of snow, or levelling the carefully excavated hollow ways, at which a company of artisans might have worked for days. Hence, fre-

quently no clear line can be drawn between these spiteful juggleries of the wind and the fall of the proper dust avalanches, because the effects of one are almost identical with those of the other.

All these strange aerial movements are not, however, the true snowstorm. The character of this fearful phenomenon is far wilder, more angry and hostile. Woe to the poor wayfarer or muleteer who is caught by a vehement "tormenta," as they are called in the Tessin, and doubly woe to him if he is not a man long hardened to the attacks of the weather,—if he is a stranger from milder climates who cannot oppose determination, iron courage, pluck, and endurance, to the rough assaults and incessantly piercing wrath of the elements. If a miracle does not save him, he is doomed to death. Thousands have already fallen victims to the monster, who have been ignorant of the warning symptoms of the storm, or have continued their road in defiance of well-meant warnings. For experience shows that the "Guxen" rage most furiously in those Alpine gaps through which mountain roads and passes lead, and, singularly enough, during north winds on the southern slope, and south winds on the northern. The Great St. Bernard, the St. Gothard, the Bernhardin, and the Panixer passes are especially celebrated in this respect. A great part of the Russian army under Suwarov was destroyed by snowstorms on this last during his retreat in October, 1799. According to the oral testimony of the Bernhardin monks, not a single man has lost his life for the last ten years during snowstorms on the Great St. Bernard.

The mountaineer well knows the signs which herald the evil guest. The pale, greyish white tinge of the horizon, from which the snowy covering of the moun-

tains scarcely detaches itself in colour, becomes denser, more saturated: it seems as though it contained more matter. The features of the distant mountains, whose naked skeletons of rock were easily to be recognised from each other, are covered by a veil, at first light, then thicker and duller, till at length they disappear. The air is quiet, very cold, but yet without that bracing, sharp coldness of winter, which so revives one's senses on a January morning in the plains, when they have been dulled by sitting indoors. A dry, frosty, hard breeze fills the air. Then all round an indescribable stillness lies over the deathlike wilderness. The springing chamois, who enliven the heights in summer, dwell now in deep-lying forests. The whistling marmot lies dormant in his winter's sleep under the rock. Even the mountain daw, which through the winter circles screaming round the splintered and inaccessible granite points, has retired to its nest in the clefts. No withered leaf rustles on the boughs, for at these heights the growth of trees has ceased, and the melancholy creeping fir and Alpine rose-bush are slumbering deep beneath the snow. Not a breath of wind puffs the grains of snow over the steep cliffs. Everywhere there reigns that mournful stillness which precedes the breaking of a violent thunderstorm on a sultry summer day. The only sounds that come to the traveller are his own deep breathing, the snorting of his horse (if he is crossing the mountains on a sledge), and the crackling of the snow under foot.

As the catastrophe draws near, massive grey clouds envelope even the neighbouring heights, and press thickly and heavily upon them, as if they were taking up their posts for ever. Now is the time to reach the protecting cantoniera (refuge-house) or the friendly hospice, if not too far off; but the twilight is growing deeper,—evening

seems to have surprised midday. Suddenly a sharp, violent gust of wind startles the hastening, but often half-wearied traveller, and dashes a handful of whirled-up snow against him ; then it is quiet again, and silent all round as before. These intermittent precursors repeat their warnings occasionally, generally at gradually shorter intervals. They are the last summons to flight. For now a strange mysterious moaning begins in the chambers and clefts of the rock, first gentle and sighing, with a faint answer from the other side of the valley, then nearer and stronger, and soon ringing further and further down the other faces of the mountain. It is as if distant despairing voices were crying for help. These lamentations in the air rise now from a third and fourth comer, drawn out in hollow, monotonous tones, quite different from those in the lowland, where the wind is howling its mournful equinoctial melodies down chimneys and through doors. The horse before the sledge is striking deeper with his hoofs into the insecure slippery path, and snorts frequently and discontentedly ; his instinct tells him of the approaching danger. Of his own accord he strains his strength more energetically to get on faster, and his driver follows him panting. A deeper ground-tone joins to the whispering monotone. The intervening voices increase, the discords become fuller, and with them the tumult swells louder and more powerfully, and howls through the air. A few moments more, and the snow-clouds discharge their burden, and send down a hail of sharp-pointed icy arrows so vigorously that every uncovered part of the body is painfully stung by them. The exhausted traveller turns from the side on which the masses are coming down most sharply ; but what use is it ? The hurrying floods of icy needles strike upon him like the surging waves of the sea ; and as the waves

beaten to foam give themselves up to the hurricane, so the clouds of dustlike snow that dash against his shoulders change their course, and attack him in front in circling whirlwinds. He can see nothing, and covers with hand, and arm, and handkerchief, his eyes, his cheeks, and his whole face, which is beginning to swell up from the cold and the burning blows. He cannot breathe; for the air, thickened with ice, passes through the organs of respiration to his lungs like a corrosive poison, and penetrates at every breath as it were with a thousand points. The fearful Alpine snowstorm has broken out in its full horror and awful wildness, and rages round all that lies in its kingdom. There is a lashing and scourging in the air that rages, and screams, and whistles, and roars round the stiff points of rock, as though the atmosphere had gone mad, and the last judgment was beginning. And, in the midst of this uproar, man, the lord of creation, who rules over matter with iron and steam, and boasts that he has subdued the elements to his will, stands a wretched, powerless, deserted creature, in the awful wastes of snow, a certain victim when his senses leave him and his last strength is exhausted.

If a short pause intervenes in the awful uproar, if the surprised traveller can open his eyes a little, he sees no trace of the way to be followed. As deep as he is standing, often up to his knees in the snow that is freshly fallen or blown together from the mountains, so deep it is lying all round. Hence the foresight of the inhabitants, on both sides of much frequented passes, has since ancient times hit upon the plan of placing "snow-poles" 20 or 30 feet high, before the beginning of winter, in firm rocks, along the whole road, as a direction to the path. In some winters it has happened that in many places these

poles have themselves disappeared under the snow heaped up on every side. For in the higher Alpine region, *i. e.* from 5000 to 7000 feet above the sea, and in the sub-nival or lower snow region, from 7000 to 8500 feet, the snow falls in quantities quite unknown on the plains, where not only the whole amount of the snow that falls is much less than in the mountains, but the constant change of temperature also rolls away the whole snowy covering more than once in the same winter.

Weariness, sleepiness, sinking from exhaustion, gradually increasing insensibility, and finally stiffening from cold, are the progressive symptoms of death. Every year demands its victims. The memory of mournful events of this kind lives in many and lively traditions in the mouth of the people that live in such passes. We can here only find room for two out of many examples.

In the year 1817 five Hanoverians had brought some horses into Lombardy, and were on their way home; all were strong healthy men, who, at home, had gone through and easily overcome many attacks of bad weather. In the village of Bernardino, an hour and a quarter south of the pass of the same name in the Grisons (on the line from Chur to Bellinzona), they were pressingly warned not to proceed, as a snowstorm was coming up, and the pass would be dangerous. Encouraged, however, by powerful Veltliner wine, and conscious of unexhausted physical power, they refused to attend to the warning, and started on their journey. At that time the present road was not made, and the strong stone-built house of refuge above the Victor Emmanuel bridge on the little Moesola lake did not exist. It was an uninterrupted journey of three hours and a half from Bernardino to Hinterrhein in the Rheinwaldthal, for which, however, owing to the increased difficulty by the new-fallen snow,

at least five hours would be necessary. A countryman of the village of Hinterrhein, who was present, was provoked by the carelessness of the strangers, and, though he had not dared by himself to set off homewards, joined the foolhardy men, when all dissuasion was useless, to help them at least as guide. The storm broke out in full fury just as they had reached the top of the pass. The men fought on against their overpowering enemy at first with light-hearted jokes, then with their whole energy, finally in despair; but in vain. Much as the bold Rheinwäldler strove to help them, one sank into the arms of death, utterly exhausted, and giving up in complete consciousness. The devoted mountain peasant strove a long time to save the last; but even here he perceived only too soon that he would himself perish if he did not give up his purpose, and apply the small remains of strength left to him to save himself. He reached his native place alive, but with hands and feet completely frozen; his fingers and toes had to be amputated. He became a cripple owing to his humanity.

Another tragical event took place on the St. Gothard on the night of the 9th of April, 1848. The Italian post, which was to cross the mountain in the afternoon from Andermatt to Airolo, had been delayed considerably later by huge masses of snow. It was impossible to cross with horses and sledges, and the "conducteur" Simen determined to have the postbags, with letters and packages, carried by porters over the St. Gothard. One of these porters was John Joseph Regli, a stonecutter by trade. When the caravan left Urseren, the storm was coming down wildly, and heavy masses of snow were falling; but the courageous mountaineers thought they might despise the weather, and pressed boldly forwards. When they had gone about two-thirds of the way, a snowstorm came down so vehe-

mently over the Lucendro Alp, and so concealed the road, that they all lost their direction completely. All round it was black night. The storm scourged the devoted men given up to its fury, as it were with scorpion-whips. Still they kept their ranks and sought in spite of all difficulty to reach their object. At length, when they had got to near the top of the pass near St. Carlo, at the so-called "waterhole" (Valeggia), Regli could get no further. His comrades, though heavily laden, sought to drag on the companion of their fate through the soft snow more than a yard in depth, but their strength gradually left them too, and they recognised their awful position, that death would certainly overtake them if they did not abandon and leave behind their exhausted companion. They wrapped him up thickly in cloaks and woollen coverings, brought him under a protecting rock, and left all the postbags and burdens by him, in order to reach the hospice as quickly as possible, and to bring help from thence. It was scarcely ten minutes distant, and yet it took them an hour and a half to reach the protecting asylum. The director of this Samaritan house, Herr Lombardi, instantly started with assistants and lanterns to save the unfortunate man. He came too late. Regli, quite covered with snow, so that they could hardly find him, was frozen.

CHAP. XIX.

RED SNOW.

IN travels in the high Alps extensive regions of snow are often met with, which attract attention even at a distance by their unmistakably red or orange colouring, and when close, look as if an enormous quantity of red wine had been sprinkled over the snow. The popular belief, whose fancy imports something mysterious and spiritual into every curious phenomenon not immediately decipherable by the vulgar understanding, has seen in this strange product of nature the bodily revelation of strange mysterious powers. They were footsteps of an avenging Nemesis, visible signs of retribution, of divine punishment for bygone unjust deeds, and the mountaineer registered the red snow in the archives of his world of legends. Dishonest carriers, who brought fiery Italian wines, such as the dark red Pulshürmer, from the Veltlin, across the Alps, had, as it was believed, overcome by thirst, opened their casks, and sinfully caroused over the goods trusted to their faith and honour. Therefore their thirsty dishonest souls were condemned, bound to the snow, and for warning to the after world, were to groan here in ice and cold till some compassionate soul should release them. The form of release is highly good natured, reminding one of the ancient ovation. Every drop of the lively, exhilarating Veltliner wine is a treasure of unspeakable

value in the desert of the high Alps when the strength is failing; the prudent mountaineer grudges every drop from his flask like a miser, and carefully spares it for his last and utmost need. The popular belief appeals to this jewel. He who freely shares his last invaluable draught with the poor souls, and pours some drops on the red snow, conciliates avenging justice, and releases the damned spirits from their "cold purgatory."

This sacrifice, heavy under the circumstances, is, thanks to natural philosophy, no longer demanded from the Alpine traveller of our days. The banished spirits are effectually released by the hell constraining power of the microscope; and the fiery drops need no longer make a misalliance with the dead cold snow.

A very different life from the dull sighing and the martyred pangs of spectral drunkards rises from these layers of apparently inorganic frost. A world of inconceivably small things grows and lives and is reproduced here. Horace Benedict de Saussure was the first to investigate the red snow, on his journey to Chamouni in 1760, and to find red particles in the melted water which contained the colouring principle. As they appeared to be lifeless, he, and many natural philosophers after him, held them to be vegetable productions, the dust of plants, gelatinous algæ, slimy mosses, and they were called *Protococcus nivalis*. The Canon Lamon, of the Great St. Bernard, investigated the phenomenon further, and, at the meeting of Swiss naturalists at Lausanne in 1828, first gave utterance to the suspicion that the red particles might be animals—infusoria. The good Bernardine monk had to bear enough hostile attacks and ridicule, for his hypothesis found little acceptance; and Hugi, in his Alpine journey, repelled these modern discoveries "with the utmost repugnance," and again de-

scribed the whole vegetable construction of these apparent plants rooted in the ice, with their boughs, twigs, and vein-like fibres. Yet the monk was right. There lives a many formed and wonderfully organised fauna of infusoria in the crystal palaces of the snow, between 7000 and 9000 feet above the sea, which there bustles about and developes a busy activity when, owing to the warmth of the sun, part of the watery particles bound to the ice melt and thoroughly moisten the névé. They never appear on the glacier, and never on the freshly fallen, dry dust-like snow, but always on the névé, and especially on those sunny slopes where fresh snow is rapidly converted into névé (or granulated icy snow). A generation may perhaps live some months in full activity, during which it penetrates the névé some two inches with a burning red, something between carmine and cinnabar, although by the prevailing whiteness of the snow the effect of its colouring is diluted to a rosy red. After completing its life and its unknown tasks it changes to a brown, and finally black moulder, which gradually sinks or branches out in stripes through the névé.

The Englishman Shuttleworth, armed with an apparatus sufficiently constructed for scientific investigations, undertook a voyage of discovery into the realm of these glacial animalculæ, and produced striking results. The Swiss naturalists, Desor and Karl Vogt, continued the inquiry, with comparative investigations into allied infusoria on the Lake of Neufchâtel, and thus at length, by knowledge of the exact sciences, the charm of spirits of the Alps and damned souls of carriers has been broken.

The principal mass of red snow is formed by a kind of infusoria (*Disceræa nivalis*), distinguished by a round or oval silicious shell, which only projects a little from the animal, but is clear and transparent. It fits so closely,

however, that its presence is not always to be detected, especially when the animal is moving. At the sharpest end of this minute animalcule two orange-coloured lips may be distinguished, with a sufficient magnifying power, from which proceed two long thread-like fibres, about double the length of the body. When the creature moves they are in constant motion, and seem to be its means of steering itself, since it has no ciliary organs round its mouth, like most other infusoria. If it stops in its walk, the two threads are drawn in with an intermittent motion, and when it is quite at rest they cannot be perceived. The full grown beasts are generally not at all transparent.

Marvellous as is the bodily organisation and way of life of this infinitely small creature, which is capable of existence only in a temperature of at least zero (*i. e.* freezing point), its method of increase is equally strange. This takes place according to unknown laws and conditions, partly by subdivision, so that the beast splits into two, three, four, six, or eight parts, each of which becomes an independent individual, grows up, and when there is no more room for it and its brotherhood in the house of its parents, the common shell is burst, in order that it may live "on its own hook," and swim about in the little world which to our eyes is almost nothing; or they transplant themselves by shoots, which come out as watery bubbles, like minute drops of sweat, on the original shell, grow, and loosen themselves, become first yellow, then red, till they are like the parent animal. Inquirers admit still a third way of growth, namely, by eggs, but allow that the observations pointing in this direction are too unsatisfactory to found a theory upon them with any confidence. The fact is that little red particles are to be found in all red snow, which often appear only as points under the highest magnifying power, and in which all the steps of increasing

growth up to that of the complete *Discerææ* may be observed, as also the passage from the round to the oval shape.

Besides these infusoria a second product is found in all kinds of red snow, consisting of a dark-red ball passing into blue or brown, round which are arranged a number of clear, transparent, conical or pyramidal-pointed bodies, which give to the phenomenon the appearance of a stone cut in rosettes, or of a ruby set round with small diamonds. The relation of the internal red ball to the particles set round it, often shining like crystals, is various ; and as these enigmatical bodies do not move, the observer does not know whether they are to be reckoned amongst the vegetable world as kinds of *protococcus*, or to be considered animals.

The third, still less frequently observed object, which is never wanting in investigations into red snow, but appears to be equally lifeless, is a brown-yellow or green appearance, never red, which looks like long bubbles. Of this too naturalists cannot say with certainty whether it is an alga or an animal.

So works the infinite Divine spirit of nature, in an element whose very existence is generally synonymous with death, and a perspective opens out into a new unsuspected world, full of living creatures whose existence and origin is all but inconceivable to us.

CHAP. XX.

THE "RÜFE."

ALL large Alpine valleys which lie within the slate, limestone and "Flysch" formations, and are enclosed by steep side walls, show in certain districts two phenomena which must strike even the most superficial observer. These may especially be remarked in the romantic Rheinthal. On the much and rightly-praised railway — perhaps the most beautiful in Europe — which leads from the shores of the Lake of Constance to Chur, in the Grisons, looking from the stations of Haag, Werdenberg, and Sevelen towards the opposite bank of the Rhine in the principality of Lichtenstein, under the lofty rock front of the "Three Sisters" (some 5000 feet high), we may observe long slopes, generally at an inclination of about twenty degrees, rising towards the mountains, covered partly with wood and meadow, partly with vineyards, which are intersected by broad grey lines of rocky débris, like the dry bed of large rivers. These smooth slopes appear more markedly and extensively farther up the valley, near Ragatz, between the stations of Meyenfeld and Landquart, at the foot of the picturesque, boldly marked Falkniss (8500 feet high), and most strikingly after passing the Landquart up to Chur, always on the same eastern side, under the original pyramidal horns of the Hochwang and Montaline chains. They are all results of the gradual weathering of the

mountain, and of the crumbling of the rock in continuous floods, and are certainly the result of thousands of years, for many places in the Grisons, which had names in the middle ages, are placed on such heaps of ruin and diluvial deposit. These broad smooth slopes of constant inclination, enclosed by neighbouring rocks, are, as already said, cut through by broad deposits of *débris*, which, as though they had been passed through a funnel, are narrow, high up on the slope, and spread out broadly in the valley towards the Rhine. These are the terrible "Rüfen," dreaded by the inhabitants, the waste-pipes of the storms of thunder and hail which discharge themselves in the mountain, of the sudden heavy rains, and of the melting snow; they lie dry and carelessly indifferent during most of the year, but when they have something to do, and are roused to activity, excite all the more terror. A walk in one of these strange scenes of activity, will make us better acquainted with the arrangement of its details and the peculiar impressions made by it. Let us choose for this purpose the "Rüfe," which descends from the little known or visited Skalära Tobel (between Chur and Trimmis), never to be trodden by any one who believes in ghosts, called, *par excellence*, the Great Rüfe, and let us ascend it from its foot in the broad sandy Rheinthal.

The rising slopes are covered below with thin common meadows, overgrown with short crisp grass, withered, sickly, and burnt up in the hot summer. They have a certain pleasing and velvety appearance in the spring and after fresh showers. These humble weeds, these modest dwarf grasses, which form the ground tone of the meadow,—the *carex alba*, with its slender stalks and the green seeds grouped round it, the *carex pulicaris*, whose low spikes, scarcely a finger's length, with their coal-black seed husks, peer forth so curiously into the world,

give the same invitingly soft appearance to the undulating ground, as the short compressed weeds to the Alpine pasturage. Indeed, many other plants remind us of the swelling cushions of our natural sofa in the Alp, where we can rest in such Diogenes-like comfort, and muse over the blue deep-lying human land so far below us. Still one of these common meadows before or between the Rügen is something quite different from an ordinary Alp meadow. Short stumpy pine bushes, with closely-pressed needles, with something of the creeping fir in them, already dwarfed by the mountains, and scattered firs with imbedded blocks of stone beneath them, occur at intervals. Gradually the turf passes into ashy-grey sandy wastes, covered with pebbles and alluvium. Here the botanical character becomes all at once quite changed. Bushes of a man's height gain a short space of existence under alternate influence of the moisture and burning drought; there are only tough lived trees; the common sand-thorn (*Hippophaë rhamnoides*), the barberry (*Berberis vulgaris*), with its violet-spotted, red, shining clusters of berries, and its sharp needle-like leathery leaves, the rosy German tamarisk (*Tamarix Germanica*), many kinds of willows, such as the rosemary willow and the small-leaved tribe of *Salix purpurea*, remarkable for the beauty and elegance of its finely-shaped leaves. Here and there on the ground is the white clover (*Trifolium officinale*), smelling strongly of bitter-almonds, and startling strangers whom we are not accustomed to see in the valley because their home lies some thousand feet higher; they are Alpine plants carried down by storms, emigrants who have settled down here and seem to be really growing acclimatised. There grows the pale-blue Alpine harebell (*Campanula pusilla*), and close to it the *Phaca astragalina*, tenderly fringed with white blue-

tipped flowerets; then the *oxitropis montana*, and then, somewhat out of its bearings, the *Saxifraga aizoides*, that greeted us so friendly on the hills with its saffron-coloured five-leaved flowers and corpulent bunches of seed, creeps along uncomfortably in the sand. We are compelled to leave this unlovely nosegay, which is made still more dismal by broad topped firs, reminding one a little of the pines of the south.

The clear grey flakes of rock, with their silvery gleam, and the white crumbling felspar abundantly intermixed, become more numerous, the path more desolate and rent, the ground burns with the reflected glow of the sun, it is quite bare of vegetation; we stand on the bank of the Rüfe, where it has been comfortably and unrestrainably stretching itself out for centuries, and laying waste all the country round with its waste barren sand formed of the ruins of the mountain. The railway has had to guard against the accidents arising from this old ingrained perversity; it has banished the bully, placed on him a straight jacket in the shape of a deep hollow canal made from the materials of his own stones, and the dirty dark grey water that hurries down every Rüfe must now take this way to the Rhine, at least till the wild spirit of the Alps takes the mischievous idea into his head to show people that all their wisdom and prudence is no use, when he is resolved to use the right of the stronger. For when a storm breaks, no one can say for certain where a Rüfe will be discharged. For when in spring, a strong Föhn wind has long been blowing over the heights, and quickly melting the high snow, or when a thunderstorm bursts forth, the dwellers near these canals which have become the plague of the country, have to keep watch day and night, and to take care that where the stream loaded with mud rushes out of the chasms, its normal bed

may not be stopped up; if this is neglected, the roaring stream rages into new paths, breaks over the land, and destroys all that lies in its way. Hence it happens that vineyards, which were formerly threatened, can now ripen their costly grapes in perfect safety, when the Rûfe has chosen another course. Often not a drop of rain is falling in Trimmis, whilst there is a thunderstorm not a quarter of an hour off in the Maschänzen and Skälära Tobel, that discharges a deluge of streams, and fires off uninterrupted salvoes of lightning like the Malakoff. Sometimes one, sometimes the other Rûfe is discharging in the storm, whilst the other is dry, and yet they are scarcely separated 4000 feet in a horizontal direction by a wedge of the mountain. It is never known therefore on which side the misfortune is going to break out.

Let us leave the Rûfen canal for a little to ascend a pleasanter route to its higher, wilder parts. The path leads through rich cultivated meadows, splendid with the most enchanting flowers, amongst which, besides the common meadow plants, are the clear blooming scabious (*Scabiosa columbaria*) the *Medicago falcata*, and the bright blue meadow salvia (*Salvia pratensis*), as characteristic plants in June and July. Such a footpath, in one of these paradisaical corners of the Alps, under the golden sunlight, when the waving sea of flowers strives to spread itself over the barren wastes of destruction, where the broad-armed walnut-trees form their peaceful leafy vaults, and the fragrant elder, inseparable from the romance of the middle age castle, spreads its heavy umbels of flowers in masses hardly ever seen before—where the distant view reveals a panorama of mountains and valleys, at sight of which the soul might pour itself out for joy—such a footpath, not to be found everywhere, is a treasure

for any one whose senses are open, and who takes hearty pleasure in God's great noble Alpine world.

Let us go on. We see here how the peasants of the Grisons turn things to account, and combine useful things together. Where others put up wooden fences on the boundaries of their fields, which have every year to be corrected and mended, the inhabitants of the district of the five villages, (the name of the country between Chur and the Landquart), gathers up the stones which are brought down into his good land by the floods, and forms breast-high walls with them. This is to be met with in the other valleys. The white-flowered *Sedum album* (called "Steinweizen" or stonewheat, from its thick wheat-like leaves), grows on these walls and in their crannies, and close to it grows its companion, the bright yellow-flowered *Sedum acre*, a rich exuberant rock-plant of tropical appearance; underneath are the more soberly coloured *Asplenium ruta muraria*, almost like parsley, and one of the prettiest of ferns, the *Asplenium trichomanes*, with little narrow branches, both of which carry their seeds on the reverse of the leaves.

The cultivation of the vine is carried on with much energy on these terraces of débris, as at Jenins and Malans. A fiery, dark red, very heavy wine is produced here, which, according to chemical investigations, is said to derive its remarkable fulness of body from the felspar which is mixed with the soil. It glistens and glimmers everywhere, a dazzling white, smooth and appetising, like marchpane made of bits of felspar. Our way rises still into the forest; a crowd of young pines between thorny heaps of stone receives us. The path is sandy, but a wilderness of forest plants surround us.

We pass imperceptibly upwards into the thick darkening forest. Then it grows lighter; a few more steps,

and we stand on the bank of the wild Rûfe. That is not the bed of a forest brook, not the course of a dried mountain stream; it is a living glacier of stony fragments, which has broken a path of considerable breadth through the midst of the proud forest. The grey dismal chaos winds down like a monstrous snake—we cannot see its end. There is nothing but sharp cornered fragments and flakes of rock madly mixed together, blocks of all sizes, some as big as a man's fist, some as a loaded harvest waggon. Between them stretch broken stumps of trees, splintered into fibres, huge roots which raise their knotty arms into the air, and other remnants of the forest which still wait for some escape, though hemmed in by the ruins, till the next raging flood brings new masses from the mountains, and pushing on the heaps before it sets them again in motion. On both sides, the careful hand of man has erected huge side dams of irregular stones, which have some analogy with glacier moraines. There are many scenes of awful desolation in the mountains; the Rûfen are amongst the most awful.

The higher we go up, the more even becomes the bed: it is filled with smaller stones, often with mere grey finely-sifted sand. A shallow rivulet of lukewarm, grey mountain water murmurs gently down it. This murmur and the monotonous whispering of the wind in the tops of the pines are the only natural sounds in the waste, solitary region. Straight up, in the rising perspective of the Rûfe, lies the proper Skalära Tobel. It is not one of the beautiful, forest-shrouded, mysterious gullies, with phosphorescent moss on the damp soil, and the winding picturesque path over the clear, sparkling mountain-brook; it is an open, treeless ravine, down which the sun shines unimpeded, shut in by pale, worn, crumbling walls of rock, some thousand feet high, in

which we may study the bent, undulating, ribbon-like stratification of the granulated, grey sandstone layers. The rocky profiles are ranged behind each other in true pyramidal forms (not parabolic) running up into sharp points, the further always projecting beyond the nearer, and on their ridges the slender pines are practising the goose step up to their tops. The chasm is closed in the background in the central mass of the Montaline by a wall of *débris*, shot out in crumbling shoots over a steep slope. By day time, therefore, it has nothing very terrible in itself. What is it, then, which gives us such uncomfortable sensations at the sight of this romantic wilderness? It is the consciousness that we are resting on a place of destruction, where invisible, and, as it were, demoniac powers, have their dwelling, and are by degrees breaking away fragments from the foundations of the mountain, to mock at the industry and cultivation of mortals; it is the mysterious agency which rules here like a spirit, and produces all kinds of fantastic appearances; it is the feeling of the popular faith in ghosts, which supposes the souls of the accursed (as in Plato's "*Phædo*") to wander round their graves, and has placed their dwelling here. Here, says the legend, is the entrance to the kingdom of shadows; here the hellish Proteus loves to walk in all his forms, and frighten the curious. In truth, for Macbeth's witches' sabbath, or Faust's conjuration of Mephistopheles, no better locality could be found than the accursed Skälära Tobel. It would be pleasant though, if out of that elder bush there started a shape like that of the *Cacodæmon* in "*Manfred*," a Samuel-like figure in a green hunting dress, with Spanish hat, hooked eagle nose, and shining black eyes! Should we be frightened? Hark! There comes a yelling, satanic "*hihihihihi*" out of the thick forest foliage close behind us. What is it? No

one can have heard our thoughts, and wished mockingly to trump our provoking wish. Or was the rosicrucian philosophy right, which spoke of all kinds of jugglery, and the stretching into ours of a mystic world of spirits? A second yell "hihihihihi," comes down from above. A stone thrown at the pinetop dislodges a magpie, which flies away laughing! Well, if exorcism is such quick work, it is an easy task.

For him who has not had some experience in mountain climbing, it is unadvisable to climb up the depths of the Skälära Tobel without a guide. In the summer of 1859, a German apothecary, botanising in this wilderness, climbed on till he could get neither backwards nor forwards, and had to stay the whole night long on a narrow ruin of turf on the steep cliff, till he was found next morning, and brought back exhausted to Chur.

And now for the breaking out of a Rûfe itself, *i. e.* the sudden discharge of a thunder-storm or rain-cloud, and, as a consequence, the wild waters breaking forth from the background of such a Tobel, running together from all the slopes, from all the mountain channels, down the bed of the Rûfe.

It is a display of the unchained powers of nature, which is like the awful avalanche for sublimity and destructive power. It has not the wild, foaming appearance of a swollen mountain-stream, breaking down in a thousand cascades; it is a thick, black, shiny soup, which moves with ponderous speed, with rough, rumbling haste. It is wanting in the graceful motion of water, even at its wildest; the lightness of the bounding, racing, surging waves striking, bursting, and scattering foam. Here all is bestial, brutal, demonic. The swollen mountain stream is like a frightened, spirited horse, galloping *ventre à terre*, but still in his unbridled speed

keeping the road in view along which he is rushing. The roaring Rûfe is like a mad bull, who sees no road in his blind wrath, dashes on with his head sunk to the ground, would take up the world on his horns, and plunges into the abyss, where he perishes.

The Rûfe does not begin by forerunners of small rivulets, or any kind of introductive symptoms. At most it is heard roaring in the distance, often (when the storm which produced it has lasted a long time) confused with the awful roar of the wind, so that one cannot tell what is the echo of the thunder from the rocky clefts, and what of the fall of stones brought down down by the Rûfe. It breaks forth suddenly, a roaring monster, a stormy sea of stones, the product of the wildest powers. As already said, it does not properly flow or stream, but the watery river of slime overwhelms and pushes before it heaps of débris, stories in height, constantly tumbling over, and as constantly rebuilt, a traveling living wall of rocky ruins. Some Rûfen do not move so quickly. Clear sky is again smiling over the valley, and the sun shining warmly, when the awful monster breaks from its layer. This is the case with the Skälära Tobel, which brings down the greatest masses. There is an indescribable hollow roar overwhelming everything, which may be compared to the most vehement cannonade of a storm, when all the sounds are collected to one huge, round, roaring, crashing volume of sound, which may be heard an hour off.

Now, is it possible to stop the course of the monster altogether? If it has built up a cross dam of its colossal stones of many hundredweights, behind which the descending mass forms in heaps; if the screaming inhabitants who are working on the bank with huge hooks and poles, cannot open a breach in it anywhere, it breaks through

its bank somewhere else, forms a new bed, tears down trees, whole lines of forest, and the gates are open for the destruction of valuable low lying lands.

Lately much has been done to weaken the power of these monsters. On the threshold of destruction, where the masses of débris begin to roll together in the valley, great dykes have been built. This has been done in the Summa-Prada stream in Domleschg, in the Medelser Valley, in Rheinwald, and Putschlav. The finest, next to that at Mollis, in Glarus (certainly one of the best), is that in the Münsterthal, in the Grisons.



AN AVALANCHE.

CHAP. XXI.

THE AVALANCHE.

THE massive crushing fall of heaped-up snow to the ground is called in different local dialects in the Alps "Laue," "Lauwe," "Lauine;" in Tyrol "Lahne," in the Romansch mountains "Lavigna." The name, as ordinarily written in civilised German, "Lawine," is hardly to be heard from the people. Philologists have already disputed about the origin and meaning of this word, and started strange game in the dark forest of conjectures: some bring in Latin, and declare that it can only come from the word, "labor, lapsus sum, labi," whilst others resort to metaphors and say that the lioness (löwin) has stood as godmother to the word, because the fall of snow dashes over the rocky wall into the valley with the rage and power of a wild beast. If we keep to the simple expression of the people, we shall find "Lau" to be the root of the word; the mountaineers, sparing of speech, shortly describe the whole phenomenon as "Lau" or "Lauine" because it takes place with the advent of the warm (Lau) winds in the spring.

The avalanche is the foster-sister of the Rufe, a monster breaking down from the heights in summer as roughly as its likeness does in winter. As the other, it is a process of shooting off a superfluity which the

heights cannot retain ; like it, the avalanche excites terror by its threatening wildness, thundering and echoing far into the valley ; like it, it has its paths of ruin covered with stones, over which it roars down fearfully ; like it, it every year does much damage in the cultivated country, and is the dreaded guest of every Alpine valley.

But it is far more various than the Rûfe, because it occurs much oftener and at almost every part of the high mountains. There is scarcely a single prominent hill which has not its regular yearly avalanche falls. Here it depends intelligibly upon the configuration of the mountains and cliffs, on their greater or less snow-fall, the accumulation of snow in particular positions, how great and violent the avalanche is to be ; and the mountaineer distinguishes several kinds, according to their earlier or later occurrence, the density of their material, the cause of their formation and their effects.

It is a stereotyped opinion out of the mountains, that any unimportant cause, such as the snowball started by a bird's wing as it flies past, the motion of the air arising from noise, from cracking a whip, from the ringing of a packhorse's bell, or even from whispering and speaking, is sufficient or even necessary to bring about an avalanche. Little as it can be denied that such causes may under certain circumstances bring about falls of snow, still they are just as little necessary conditions of such a fall ; on the contrary, the most massive, fearful, dangerous, and regular avalanches are produced after quite a different way.

They may be roughly divided into winter and summer avalanches. The fearful, dreaded, and irregularly occurring "dust-avalanches" belong to the first. They are in certain respects the strongest form of snowstorms. Either a storm raging round the summits heaps up

incalculable burdens of fine, sandlike, fresh-fallen snow, raises it, and lets it fall like an impenetrable cloud of dust, wherever the bearing power of the wind is suddenly interrupted ; or it is fresh snow, lying on a smooth substratum of old frozen *névé*, set in motion by a gust of wind, increasing, as the mass increases, in weight, pressure, and velocity, and thus hurled over a cliff. The effect produced is twofold. On one hand, the falling ocean of snow envelopes, in a second, countries, houses, men, and cattle, so completely that in many cases they lie deeply buried, and can only be saved by the most speedy help ; on the other hand, the compression of the air by the rapid fall is so violent that by the mere pressure of air, like an explosion of powder, blocks of stone, houses, cattle-stalls, objects of every kind, which the avalanche did not cover with its sheet of snow, are pushed aside, set in motion, carried by the air over precipices, and dislocated in the most capricious way. As the wind is the proximate cause of this, they are called also wind-avalanches. Other levers are, however, set in action to produce motion by these flying clouds of snow. When this dustlike snow is lying on a smooth inclined plane, any impulse is sufficient to set many acres of snowfields in motion ; and this is the origin of the metaphorical saying, which has become proverbial, of an “ increase like an avalanche.”

The most memorable misfortunes of the Alps have been caused by such “ dust-avalanches.” On the 14th of January, 1719, the whole village of Leukerbad, with the exception of a few huts, was destroyed by one, which overwhelmed the houses with such an incredible burden of snow, that only a few of those buried alive in their dwellings could work their way up to daylight. A boy, Stephen Roth, was shut up a whole week in the corner of

a cellar, and could not break his icy prison with his feeble powers. He sang loud psalms and hymns to the praise of God, and was consequently heard by some energetic diggers, freed, and drawn up from the darkness. Notwithstanding every care he died the next week. The monster had destroyed fifty-five human lives. The following year, in consequence of heavy falls of snow, many accidents were caused by avalanches. During February, one hundred and twenty houses and stables, with eighty-four men and above four hundred head of cattle, were killed by an avalanche at Obergestelen, in the Valais, and another in the same year killed sixty-one men at Fethau, in the Lower Engadine. Near Brieg, forty men perished, besides many single accidents on the Great St. Bernard, in the Viescherthal, and elsewhere. In 1749 almost the whole village of Rüäras, in Tavetsch (Grisons), was overwhelmed by such an avalanche, which rushed down from the Crispalt two hours off, and buried over a hundred men. As the avalanche came down in the night when everybody in the unlucky village was asleep, many whose houses were not ruined, or were only softly pushed aside all standing, knew nothing at all of the awful accident, and only wondered on waking that the night lasted so long, till they convinced themselves that they were immured in a Bastille of snow. Some sixty men were saved by their own exertions and that of others. The most remarkable accident in modern times is that which in 1827 struck the Valaisan village Biel and killed forty men. Meanwhile many examples of extraordinary, even comic, escapes are known. Thus, in December, 1836, a house in the Avensertal (Grisons), in which twelve playing children were collected, was seized by an avalanche, shoved on horizontally, and so covered with snow that not even its roof-ridge was visible. The parents of the children,

paralysed by fear, hastened with shovels and spades to the place where they supposed the house to be; but even before they had seriously set to work, the children came creeping out of the snow, all right, one after the other. Still more singular is the accident related by Bilibaldus Pirckheimerus, in his "*Bellum Helvetium Maximiliani I.*" At the time of the Suabian war, 1498, four hundred imperial soldiers were carried off by an avalanche and thrown over a cliff; but, strange to say, the whole heap of snow became as full of life as an ant-hill, and amidst roars of laughter from the soldiers who had not been touched, all the others, without exception, crept out, some certainly hurt, but none fatally injured.

One can scarcely form a right conception of the power of the draught of air generated, without examples. In the valley of St. Antony, in the Grisons (from which a pass leads out of the Prätigau over the Rhatikon chain to the Gargellen and Montafuna valleys), a man saw an avalanche starting high up on the mountain wall (perhaps an hour and a half distant), and hastened to reach a stable which was in a tolerably safe position. Though it was only fourteen paces off he could not reach it, but was seized by the forerunning gale of wind, thrown over the Dalfazzer tobel, and there buried by the avalanche which followed with the quickness of lightning. In the year 1754 a dust-avalanche descended from Piz Muraun over the St. Placis valley, filling the whole valley from the road to Caprau, carried off a drinking trough of hewn granite from Falcaridas to Brulf, a quarter of an hour further up, and the mere side-wind of this avalanche overthrew the cupola of the eastern tower of the monastery at Dissentis, although it was half an hour distant from its proper path. For an avalanche completely to uproot forests of some thousand stems by the blast of air, or crack them like matches and

strew them around, is by no means rare; every high Alpine valley produces yearly more examples than we could wish.

It is ordinarily the case that an avalanche that has fallen becomes the cause of other secondary avalanches by its energetic gusts of wind, and the thundering roar, which produces other blasts, and hence we may explain what is said in the Lauterbrunnen valley, that in the last century the Stufen avalanche was falling for twenty-four hours. A very modern case shows something similar. In 1854 there was such a long-continued fall of avalanches on the shady side of the Realp valley, that for more than an hour one snow mass after another was being set in motion by the gusts of wind and shaking. Roads and streets were covered with firm compact snow to depths of twenty-five or thirty feet, so that to open a communication tunnels had to be driven through the improvised rocks of snow. Avalanches had come down in places where none had fallen within the memory of man.

“Greif’ an mit Gott! dem Nächsten muss man helfen,
Es kann uns allen Gleiches ja begegnen.”*

This speech of Schiller’s William Tell is a great truth drawn from the life of the mountain folk. It is nowhere true in so high a degree as in the Alps. Carelessness or a certain comfortable “happy-go-lucky” feeling is an undeniable characteristic of all pastoral people; their contemplative out-of-doors character, their slowly progressive reflection, stops every hasty decision and inconsiderate action; but still their willingness to help, their self-sacrificing spirit, their almost herculean endurance in misfortunes brought about by natural causes, are really

* “Lay hold, in God’s name! One must help one’s neighbour:
The like may happen to us all.”

noble, and show their humane characters in the clearest light. "The brave man thinks of himself last." There are hours of feverish industry, in most painful suspense, to save the life of their acquaintance, friends, fellow-villagers, or of men completely strangers to them. Where are the right places, where the buried, near to death by the starvation of frost, are struggling with the merciless foe of all life? Every spade-stroke, every shovelful of snow cast aside, may be only heaping higher the grave-mound of the man they seek. For, strangely enough, those working above can generally hear nothing of the calls for help and cries of anguish of those overwhelmed, whilst, on the contrary, those who have been saved always relate unanimously that they have heard every word of those who were looking for them, and could even distinguish the voices of their friends.

Let us only place ourselves in the agonising position of these victims of the avalanche, dreadful enough by the surrounding cold, and add to it the consciousness that help from a friend's hand is labouring to exhaustion in the wrong direction a few paces on. When human wisdom is at an end, the finer instinct of animals begins; and as the dog follows the steps of his master or of the lost child for hours, and at length finds what he seeks, here it is the faithful companion of the mountaineer whose fine scent discovers the burial-place and leads on the right track. The value of the dogs of the hospices of the Great St. Bernard, Simplon, and St. Gothard, is too proverbial, and has been too comprehensively and faithfully described in Tschudi's "Animal Life in the Alps," to be spoken of at greater length here.

The "Schloss," "Schlag," or "ground" avalanches are remarkably different in their origin, cause, and effect, from these dust-avalanches, which consist of a lightly coherent snow, and generally fall in winter. These are a pheno-

menon of the spring, when Nature celebrates the feast of her resurrection, and the high Alps are shaking their winter dreams from their memory. Here it is quite different substance, not that sandlike, dry, fine snow, which is scattered by the winds, as a plaything of the air, without end or aim; here it is old settled snow, which has lain on the slopes through the winter, grown dense, become *névé*, and received a much more compact and firm formation.

Neither the wind whirling the snow up in thick clouds, nor the trifling causes which start unimportant fragments, nor mere oscillations of air, are able to bring about "ground" avalanches; the warm Lau winds and the approach of warmth cause their awful fall. These penetrate the narrow hollow crevices in the boundless snow slopes, dissolve the snow which lies next to the turf or rocks into flowing water, which makes the ground slippery and destroys the connection. Thus slowly prepared, robbed of their natural substratum, the cohesion of single particles of snow is incapable of restraining the whole massive undermined snowfield; the law of gravity dragging it down asserts its rights; the mass loosens and slides downwards, according to the greater or less inclination of the mountain, increasing in speed every second. All that lies in its way is enveloped in the threatening masses and carried to the valley. In the Bernese Oberland they are called "*Schmelz-lauiner*" (melt-avalanches). The ban-forests are intended as a protection against the attack of these ground avalanches. But even smaller bodies of plants can do much in chaining the snow to the earth, by becoming intertwined in it and hindering its fall, namely, the grasses and weeds that grow upon the steep shoulders and slopes of the hills, the material from which the poor wild-hayman provides his cows or goats with winter fodder. Where it is mown in summer, these sliding avalanches

almost always show themselves in the spring, whilst the standing stalks of grass that withered in the autumn form a tender means of connection between the earth and the snow.

Most ground avalanches have their regular passages, their acknowledged channels, recognisable at a distance, called *Lauinen-züge* (avalanche draughts), through which they rage down every spring. They have some relation to the beds of *Rüfen*, but are less filled with ruin, and show smooth chiselled channels of rock, 100 feet in diameter, in which some of the mountain *débris* always remains. The inhabitants of the *Tavetsch* every autumn cut down the bushes of Alpine alder on the less inclined slopes, in the higher regions where the regular growth of trees has almost ceased, make fascines of them, and lay them in these avalanche channels, in order to weaken the destructive power of the falling masses of snow. The mountaineer does not need to carry such bundles down, or to set them on sledges when they have been brought down by the avalanche to the valley. He collects them, when the fallen snow has melted in the summer, as fuel out of the waste heaps of ruin, and thus makes the hostile power of his enemy useful to him. It would be a useless endeavour to prescribe the path of an avalanche by human hands.

As the passages of desolation are thus known (they are generally at right angles to the floor of the valley), as the mountaineer can judge by the form and direction of the clouds, by the transparency of the atmosphere, by the crumbling of the small snowy fringe from the cornices of rock, what is the probable temperature on the heights, he does not find it hard, from former experience, to calculate the time within which the ground avalanches must break loose; and hence he can take measures of precaution. For many avalanche channels cross frequented

roads in the valley, and make passage in the spring very dangerous; thus it is, for example, in the inhabited lateral valleys of the Valais and Uri, all the places on the great Alpine roads, where galleries are used, and also in special places in valleys through which post-roads lead, as in Oberhalbstein in the Grisons, in the Engadine, in many valleys in Savoy, &c. A district in Davos (in Grisons), between Glarus and Wiesen, has a particularly evil name in this respect, and this peculiarity has given rise to its name "In der Züga." Where houses and stables have had to be built in such terrible places, the foresight of their inhabitants has always placed them on the projections of the mountain slopes over which avalanches could not probably break. All permanent avalanche paths have gained special names, as the Golper, Schütz, Mäder, and Loch-Lau in the Haslithal; and, on the Mettenberg, above Grindelwald, the Breit, Schmal, Doldis, Brunnhorn, and Hochthurm Lauine. Sometimes a mountain seems as if it disagreed with itself, and would dissolve only in a number of small avalanches, and then no names are sufficient to describe fully the number of snowfalls.

The picture which fancy has built of the appearance of an avalanche during its fall is as erroneous as the notions as to its various causes. It is not a round ball, as people fancy, which in its place of formation is the size of a cauliflower, and increases by rolling over and by the adherence of particles of snow, till at length it forms a ball of colossal diameter, which is not crushed till it bursts in the valley like a bomb: such a progressive spherical form, as one sees made by boys in the lowlands at the beginning of winter, when they want to build a snow man, would at least require a uniformly inclined mountain slope, interrupted by no rocks or cliffs, and thus of hill-like formation. The fall of an avalanche, of any

kind, is in form almost exactly like a waterfall completely broken into foam. The fall is generally heard sooner than seen. Startled by the thundering fall, a stranger not acquainted with the awful phenomenon generally looks upwards, and seeks in the atmosphere for the thunder-clouds which produce these sounds of thunder; but peace is in the deep blue ether—not a cloud is swimming in the aerial ocean. Now the roar rolls through the valleys, and renews in stronger swells the waves of sound, while the eye, sinking lower, perceives on the silver mantle of the mountain a smoking, dustlike cloud moved by the breeze, and close below it a sliding motion in the slopes of *névé* which just before were hanging in the stillness of death. With apparent slowness, at measured intervals, the snow cascade sinks over the rocky walls like broad ribands of satin, plunges more deeply over the cliffs, bursts into round woolly foam-bows and fluttering curls of cloud, like the intervals of a cataract, or loses itself for seconds in concealed gulfs, and sinks down, repeating the spectacle from step to step, till it comes to rest on level Alp meadows or in deep basins. On the disappearance of the apparent stream, the rolling thunders which accompany the fall cease also, and the traveller becomes convinced that the two agencies have a mutual relation to each other. But where the seeming stream of dust rolled down, there is now a dirty pale line in the midst of the dazzling snow, showing that something more than snow, that earth and fragments of rock, must have come down to leave such traces.

Such is the picture of a summer “ground avalanche,” painted from a distant and secure point of view. If one could approach nearer to the falling avalanche, with a telescope of greater magnifying and defining power, it would show quite different forms, and, like the unsus-

pected cellular tissue of organisms under the microscope, would suddenly display boundless snowfields, in whose embrace cyclopean fragments of rock, massive blocks of ice, and torn-up sheets of turf, would fly down shrieking and howling. What appears to the naked eye like harmless descending masses of foam, becomes a madly raging fury when seen from near; for, as is usual in the Alps, we have no sufficient measure of distance by which to judge the heights over whose unbroken surface the avalanche is breaking. If we subtracted the approximate height of the place where the avalanche buried itself from the height of the point from which it fell, and divided the resulting difference by the sum of the seconds during which it lasted, we should gain a quotient of speed for the enormous rapidity of fall, which would at the same time explain the thunder of its descent.

A ground avalanche in spring, seen as near as possible, is terrible, almost indescribable; all words and descriptions are insufficient to paint this chaos, this complete dissolution, this universal, instantaneously developed phenomenon of hurricane, earthquake, landslip and thunderstorm, uproar, flight, destruction, annihilation, accompanied by the crashing of the snow pressed together, the overwhelming roar of splintered trees, the hissing flight of rocks, and their sharp blows against the cliffs,—in short, an undefinable deafening tumult, whose echo, repeated a hundredfold from the corner of every valley, is collected into the roar. Such is the general impression of an avalanche close to one. Its material is denser, thicker, and heavier than the airy dust-avalanche; hence it lodges itself firmly with iron tenacity wherever it falls. People and beasts overwhelmed by the avalanche are, in general, hopelessly lost; it breaks their necks or spines, or hermetically covers their bodies so that they must die of

suffocation. The snow of these avalanches is so compact that men or beasts, when sunk up to their neck in it, cannot work their way out without the help of others. Hence it happens that in valleys with a rapid stream, vaulted snow bridges are to be found, even in the midst of summer, which have their origin in the fall of an avalanche. They are often so compact and lasting that they might be crossed with horses and carriages. Their origin is caused by the mountain stream having been dammed up by an avalanche, and, owing to its greater warmth, eating its way through, and gradually increasing the arch. When the stream is not up to this, when the dam of snow is so great and powerful as to hold back the water, great misfortunes may happen to places lying deeper in the valley. For it happens not unfrequently that an avalanche not only fills the valley from one side to another, but is even pushed up the opposite slopes. When the warmth of the sun is melting and gnawing away the dam of snow in the valley, the water of the stream, turned into a lake, breaks out with its fearful power, tears down the neighbouring lands, uproots trees and weeds, covers paths, bridges, mills, houses and stables, carries away firewood, big stones, men and cattle, and lays waste the whole country round.

Between the two described forms of avalanche lies a third, which occurs in part independently as the fall of an avalanche, but is more frequently produced by one of these kinds of fall; these falls are produced by the so-called "Wind-schirme," "Schnee-schilde," or "Schnee-britte." The principle of the formation of these several accumulations in the mountains, and their form in miniature, are known to every lowlander by experience. They are those coverings of snow and vertical shapes which arise when the wind throws large fat flakes upon build-

ings, walls, fences, and other objects, under a proportionately mild temperature, and with a heavy fall of snow. If the snow then ceases, the masses increase, bend over, and, at last, under the action of the sun's rays and repeated frosts, assume the complete appearance of hanging cornices of snow. What thus appears on a small scale is formed on a large one by thick snowfalls in the rocky Alps, whose almost vertical walls are interrupted by all kinds of splits, vaults, and corniced façades, and this in such colossal shapes that overhanging roofs of snow, completely loosed from the rocky wall, rise upon narrow supports, and seem every instant to be coming down. These swords of Damocles hang fast, till they break off by the weight of their own snow, or are torn off by the warm air, "dew weather" or Föhn, or a change in the direction of the wind. It is to these that the packman or postilion, and every mountaineer, who is travelling in winter, raises an anxious gaze; these are the avalanches which may be robbed of their tottering equilibrium, of their cohesion, and of their narrow hold to the rock, by the most trifling causes, by a sound or a motion of the air. These are the reasons why the postilion does not crack his whip,—why, in former days, when there were no protective galleries, the packman took the bell collar off his beasts when he passed the narrow defile of the Schöllenen on the St. Gothard, of the Cardinell on the Splügen, and other such gorges; and it is these to which Schiller refers in his mountain song,—

"Und willst du die schlafende Löwin nicht wecken
So wandle still durch die Strasse der Schrecken."*

* "And, if thou wilt not rouse the sleeping lioness,
Pass gently through the road of horror."

Many accidents have before now been caused by such "windshields." In March, 1824, the post sleigh with thirteen persons, travellers, pioneers, guard, and postilion, was struck by such a fall and carried over a steep cliff, from which eleven men were saved. One of the pioneers, however, and the landammann of Roveredo in the Val Misocco, were killed by the mere pressure against the roadway. On the Skaletta pass, between the Engadine and Davos, a whole caravan of fifty-two sleighs, with men and cattle, was carried off by the fall of a "windshield" some thirty or forty years ago; the preceding blast of wind hurled some of them far through the air. No one, however, was killed, because it was soft sandy snow. In the Cardinell, a pass at that time of the worst repute on account of "windshields," the pressure of the air produced by the fall of one carried off a drummer during the passage of the French army under Macdonald, in the winter of 1800, where he appears to have fallen without injury, for he was heard for several hours drumming in the depths. As, however, it was impossible to send assistance to him, he fell a victim to cold and hunger. Martin Meuli, of Nufenen, entered the Cardinell late in an evening of 1807 with his comrade, Christian Menn, and some packhorses. Suddenly an avalanche rushed down, carrying off Christian, with his horse, into the gulf. Meuli remained uninjured, shut in on both sides by high walls of avalanche snow, and spent the cold winter night under a projecting rock; he saved his life by rolling himself up in a packet of cloth which he was carrying on his horse.

Such falls often cover the roads, like ground avalanches, with snow dykes as high as houses, so that the pioneers cannot make a path by mere shovelling, but have to break tunnels through. This was especially the case

in the high Grison passes during the snowy winter of 1859-60.

The dwellers on such passes tell wonderful stories of the instinctive prescience of many beasts, who forebode or, one might almost say, prophesy the fall of avalanches. It is notorious that on those slopes which are in any way affected by the regular fall of avalanches, the tracks of chamois are seldom or never to be found in the snow. The inhabitants of mountain inns and hospices declare that the mountain daws come down from the heights shortly before the occurrence of dust-avalanches or the fall of windshields, flying, as it were, to human dwellings, and screaming as they circle round them. It is said that the dogs kept to look out for distressed travellers show a perceptible restlessness shortly before avalanches or whirlwinds, and there have been some on the Simplon who howled loudly and tried to get out to search according to their business. Horses, however, show the most decided feeling of bad weather. We have mentioned, in the description of a snowstorm, that the horse exerts his utmost strength before the breaking out of a storm to get on quicker, and, if possible, to reach the protecting house. A horse is said to have been used for many years as a packhorse over the Scaletta pass, who regularly showed the approach of avalanches by becoming excited and restive, though at other times he was the most patient and quiet beast in the world. The drivers, who set a high value upon it on this account, depended almost entirely upon this horse in bad weather. It once had to draw some passengers on a sleigh during winter, and having come to a point near the top of the pass, refused to move from the place. The travellers, foolishly enough, and the driver, giving way to their impatience, did all they could to drive the beast on. At last, after showing its disgust

at human unreason by loud neighings, it applied all its strength anew, and sought, by an almost desperate hurry, to escape from the threatened danger. A few seconds further, a sudden crash and fall! The avalanche had buried the travellers and the clever faithful horse.

The mountaineers can tell by trying the snow with their hand, and by its appearance, how far it is ripe for an avalanche, and thus arrange their mountain journeys. These are usually undertaken in company when they lead over long and wild passes, but always in sections, so that each sleigh is at some distance from the others; if a fall of snow happens they are then not all carried off at once, and those who escape can come to the help of their overwhelmed companions.

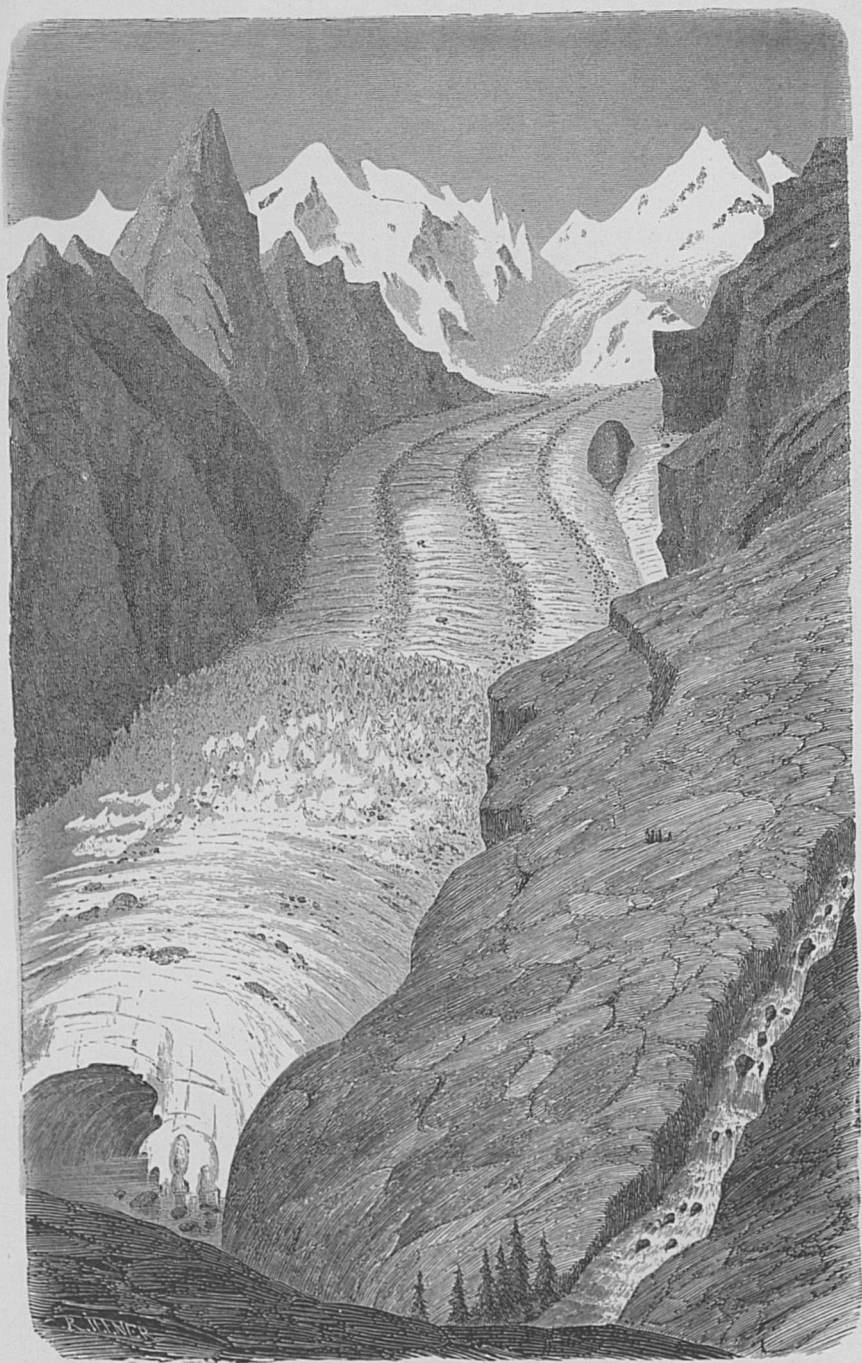
Avalanches are only phenomena of the lower region, especially of that on the borders of woody vegetation; they scarcely occur at a height of over 10,000 feet. Even at the greatest heights snowslips take place, which move downwards, and, under a warm south wind, the icy cornices occasionally fall from the steep ridges; but such very trifling and partial fractures have too little of the character of avalanches to be included in this description. Spite of their devastating fury they are a beneficial phenomenon for the lower regions, for they free whole districts of Alp meadow land at one blow from an incalculable weight of snow, to remove which the warmth of sun and wind would have to labour till far into the height of summer.

CHAP. XXII.

THE GLACIER.

WHAT the avalanche does in a few moments in the wild storm of irrestrainable passion, the glacier carries out in long thoughtful steps. Both have the same task—to free the high mountain from the threatening burden of snow, and to prevent a gradual freezing of the whole framework of the Alps and of the country round; both are levelling powers, canals for drawing off superfluity; both tend to the same end but by different paths. The avalanche is a youthful thoughtless phenomenon, which loses all foothold, throws itself as a victim into the arms of death at one bold spring, and conceals the still unconnected and half formed bodies of snow in any corner of the valley like a self-murderer. The glacier is an old thoughtful economist in the mountain household, who, in apparent laziness and quiet, but really in uninterrupted activity, is gathering together, with quiet practical tact, the superfluity of the soft snow of the high mountains, condensing it to firm solid ice, and carrying it slowly down to the valley. It is one of many thousand wonderful proofs of the divine order which regulates everything in the vast organisation of natural life, which gives everything its measure and object, and wards off absolute death throughout the vast cycle of nature.

Everything that shines down whitely into the valleys



GLACIER.

and Alpine villages during summer from the heights of the snow region, and the mountain channels, is summarily named by the Swiss peasant "Gletscher," by the Tyrolese "Ferner," by the Romansch "Vadret," and by the Valaisan and Savoyard "Glacier." He makes no physical distinction between ice and snow, they are all the same to him. Science, on the other hand, distinguishes according to the material, density, and elevation, the soft mountain snow above 10,000 feet from the lower, granulated, older "Fern" snow (whose name is derived from the idiomatic meaning of Fern, viz. "of former years"), and this again from the compact transparent glacier ice. The last is produced out of the first by a series of unmarked gradual changes of these crystalline watery forms. The fine high snow in the loftiest regions may thus be compared to the period of childhood. By its own weight and the pressure of the masses behind, it slides slowly downwards, and by the effect of warmth becomes gradually more closely allied to the granular conglomerates as it passes into the age of youth. As it is pushed deeper into the rocky lanes and gradually travels into warmer regions, it undergoes new phases of formation: it absorbs the falling rain, binds it to its crystals by its internal cold, and finally condenses into porous ice: it enters the age of man and becomes the glacier substance. Now, as in the life of a man, it has great oppressions to endure. Pressed into the deep mountain gorges, the glacier has to follow the windings and falls of its river-bed, as the given conditions compel it. We say, intentionally, river-bed, for not only is it like a stream turned to ice, on account of its descent between chains of rocks and mountains, but the glacier flows and moves like the river down to the valley, certainly with less speed, in consequence of which its motion leaves the dates of its journey upon huge wall-timepieces. It has to

bear down burdens of fallen stones on its back, furrows tear its surface till it reaches the end of its life in the valley, and dissolved into water hastens to the sea.

It is hard to make an approximately accurate conception of the real nature and appearance of a glacier. The best representations, even faithful photographs, give only dry, superficial, one might almost say wooden pictures. The space too of the largest painted or drawn landscape in the high mountains is always too small to show even approximately the gigantic size of a glacier in its awful masses; its proportions always become trifling and worthless. The stereoscope at best, when very well chosen pieces have been inserted in it, may give some partial idea of the sublimity of the phenomenon. Even at some distance, when observed from a neighbouring overhanging mountain, the mightiest glaciers vanish, under the contrast of the imposing framework of rocks, into subordinate dirty white stripes. These, the mountain giants of the granitic and limestone ranges, with their cones, ridges, and cornices, rise freely and boldly into the air, show the size of their bodies in strong rough lines, and give points of view from which their height can be measured owing to their many-sided profile: the glacier hides the amount of its incalculable contents in the mountain gullies, which it fills; it is a buried body of which only the superficial area is exposed. Hence, in this case, nothing but a journey on the back of this icy serpent, a look into its chasms, precipices and secret deeps, and the entrance through the glacier gates, can really make it known to us.

Completely formed glaciers, bearing all the characteristic marks, can only be found in the central chains of the Alps, where the elevation of the mountains has been most direct and energetic. The most vast and capacious glacier districts are the central masses of Mont Blanc, of

the Valaisan and Bernese Alps, of the Bernina in the Grisons, and of the Oetzthal group in Tyrol; those, that is, which enclose the most extensive magazines of snow in their hollows. Besides these, the Graian Alps of Savoy, the Tödi group in Uri, Glarus, and the Grisons, the central masses of the Adula or Rheinwaldhorn, the Selvretta group in the Lower Engadine, the Ortler group, and the Tauern (ridges) of the Salzburg and Carinthian Alps enclose considerable glaciers. Half formed and second-rate glaciers occur in all parts of the Alps, which attain a height of 8000 feet, and enclose a few plateaus on this high level, which are sufficient to collect the provision of snow. It would be in vain to seek for glaciers on mountains which do not rise above the snow line (7000 or 8000 feet) in their mean elevation. We easily ascend through meadows and pinewoods. Thick groups of trees still shut out every prospect. Now it grows clear, and leaving the depth of shadow, we enter naked rocky ground, which appears to have been strangely carved and chiselled, as it were, by stonehewers, into every kind of hollow basin and undulating swell. Brightly blooming Alpine roses, in rich abundance, shine out from the heaps of ruin, or from the rocky clefts which have been choked with earth, an enlivening ornament of the barren wilderness. Turning one more mountain bar, the view expands — we stand in face of the glacier. Walls as high as church towers rise up and prevent us from penetrating further. Is that a white, snow-covered, primeval dirty-grey rock, which overhangs as a fantastic ornament? The transparent glassy clefts in its walls, which arrange themselves along it like deep folds, seem to argue against this. We clamber over strangely piled walls of blocks with sharp-cornered fragments of rock, roughly made barricades of considerable height, and press, with our curiosity excited, nearer to

this enigmatic wall. Now we discover a broad vaulted canal at its foot, which shines with most fairylike colours till it disappears in the depths of indefinite night. Now we suspect that we are in the presence of a gigantic wall of ice. The grey mass, which at first view seemed to be an independent body of rock, is nothing but incorporated stones with which the fall of the glacier is sown over. The first guess of the tremendous massiveness of a glacier occurs to us at length; the suspicion for the first time presses itself upon us that the huge dyke of ruins which we just crossed consists of flakes of stone which have fallen from the glacier. A superficial view, even if we had never before attended to mineralogy, tells us, as we compare the material, grain, and colour of the blocks before us with the polished stone, that it is of quite different origin. These artificial heaps are called frontal moraines, "Stirn-gandecken," or "Firn-stösse." They are results of the gradual disintegration of the rocks, a collection of samples of the kinds of rocks which surround the glacier. The glacier has slowly carried them on its back from mountain slopes two or three hours off, and we gain from them the first proof of the travelling activity of the apparently still mass of ice. The opening which appears on the icy wall below is the glacier gate, from which a broad rapid brook of melted icy water is streaming.

The water is milky-white, or a clear cloudy-grey, seldom transparently clear. Whence is its colouring? The glacier, sliding slowly with its burden of millions of tons over the granite or limestone rocks of its bed, gradually chisels off particles of rock, and colours the glacier water with them. The hollowed surfaces, over which we came just now, are also results of this polishing activity. We find on the Riffel, along the Görnér glacier from Monte Rosa, and again near Zermatt, on the Viescher glacier, and

again on the banks of many others, these strangely polished hummocks of gneiss and granite, which give information that the glacier formerly, when it was higher, broader, and larger, passed over these places and thus rounded them off.

Many glaciers have no glacier gate at all, but run, spreading themselves out as smoothly as a mussel-shell, with a gentle inclination towards the floor of the valley. Such is the noble Rhone glacier, the Rosegg glacier in the Bernina group, &c. Many others have lofty imposing glacier gates, like the portals of a Gothic cathedral. The largest and most beautiful are those on the Glacier des Bois, in the valley of Chamouni, from which the Arveiron streams forth, in many years more than 100 feet high. On the Morteratsch glacier, in the Bernina group, which sends down the Flatz-bach to the Inn, and the Marcell glacier, enticing as it is to penetrate into these azure-blue or glass-green halls of ice, it is dangerous on account of falling stones, which lie upon the back of the glacier at its end, and of fragments of the ice itself, which are continually loosening themselves and coming down.

The proper colour of the glacier ice is blue, as it is generally of all pure water. Various other circumstances, however, must affect its more or less intense hue, as some are especially distinguished by their beautifully deep colour. Such are the Arolla glacier in the Val d'Erin, the Rossboden glacier on the Simplon, the frequently visited Rosenlaui glacier near Meyringen, in the Bernese Oberland, and the Upper Grindelwald glacier. People who enter the clefts of such a strangely lighted building of ice, are magically tinged by a blue light, which kills or weakens all other colours, and gives to the red healthy countenance the pale hue of a corpse. It is a really spirit-

like blue, one might almost say a bewitched phenomenon of colour; for the same piece of ice which radiates in the glacier grotto with an indigo flame loses its whole noble colouring when brought to the light of day, and appears of colourless transparency, like a piece of river or lake ice.

In order to get on to the top of our glacier, we must clamber through entangled weeds, and over split fragments from inundations to its lateral walls.

The first impression which the surface of the front part of a glacier makes upon the observer, is in general by no means one of surprising grace. Most of them have a dirty appearance, strewed over with sand and mountain débris, something like that which occurs when a sudden thaw succeeds a violent fall of snow in a town. There are glaciers so covered with pebbles and knotty fragments that for a great distance no ice is to be seen in them. This dirty rubbish proceeds from the medial moraines, with which we shall soon make nearer acquaintance.

The farther we penetrate, the more torn does the surface become, but at the same time the ice appears in greater purity. The next thing to attract our attention is singularly formed, splintered, pyramidal fragments of ice which, resting on fractured surfaces, sometimes overhanging, sometimes stiff and firm on a broad base, display the strongest crossing and various shapes. Climbing a few paces more on the glacier's brink, we reach an open point of view. Heavens! what destruction, what a sea of cliffs and chasms, what a wilderness of confused forms. What is the field of ruins of a landslip beside this more than fantastic chaos, which seems to lie quite beyond the range of all that we have hitherto seen? Here is no longer the rough, rocky, utterly inorganic mass of fragments from

the cliffs, as we have seen elsewhere,—here there appears an unmistakable formative influence, a law of forms quite strange to us, in which we cannot quickly enough discover the leading thought. Our eyes sweep round anxiously and curiously, and constantly discover a kind of ground-plan, without being able to find the desired point of rest. Has a Titanic architect ventured upon the attempt of raising an airy castle of ice-blocks to the spirit king of the Alps, and given the most irregular shapes to them in his ornamental fancies, but left his work of building unfinished? Such is the impression made upon us, when we look for the first time over that part of a large glacier, which is covered with so-called “ice-needles.” Whence comes this strange accumulation of spikes over its whole breadth? If we try to explain it by a comparison, we say it is the waterfall of the icy river. As the stream, when its bed is interrupted and falls, because there is a step in the valley, rages down in a dust of foam and spray, to start anew on its way in a lower bed, so has the slowly moving glacier here too lost the ground below it, the rough masses of ice could not hold themselves up, they split, tore themselves away by their own weight and fell over. But blocks upon blocks piled themselves up so that the difference of level has disappeared from the eye, and we only see the surface of the icy ruins streaming downwards at a steep inclination. There would be panes of ice like those which we see formed on a small scale in winter when the confectioner refills his ice-house; but here invisible hands model the fallen fragments of ice, hollow them out, and polish off their corners, and these concealed artists, who are always giving them new forms, are the sun, the warm breezes, the rain, and the returning frost. These modellers touch

up and wash now this place, now on that, along the crystalline edges of fracture, and make such strange forms, flat from their unresting activity, that disordered and yet combined effect appears, which struck us so much. But as all these agents work from above, the tops of the ice fragments are first seized, and hence arise the obelisk or tower-like forms significantly called ice-needles, because their tops strike up so sharply towards the zenith. Examples from thirty to fifty feet high may be seen on the Görner glacier above Zermatt, on the Glacier des Bois, below the Chapeau, and on the Montanvert, as also further back in the Glacier du Talèfre, and on the Pasterze glacier on the Grossglöckner. The Rhone and Grindelwald glaciers also abound in them. They frequently cover spaces a quarter of an hour across.

But as the clouds of foam of the waterfall leave the imprisoned air-bubbles below, and again unite into a smooth homogeneous river surface, just so the icy ruins not far below the line of the cataract soon unite again into one body by means of compression, saturation, and regulation of the melting water which is filtered through them in drops, and form at its end the compact glacier front.

Let us go on! Now at last we can get on to the glacier. It is near mid-day, and the sun is hot. How very different from what we expected is the tolerably level glacier surface. It is furrowed by thousands and thousands of little channels, which have formed crossing and meandering paths. The little watery veins of the icy water, of diamond clearness, scarcely one degree above freezing, hasten down to the greater brook-like furrows, whose bed always consists of transparent glacier ice. These brooks, after a short course, fall with a

roar into deep funnel-shaped holes, called "mulden" or "moulins," into which they disappear without leaving a trace. There are secret canals which reach in all kinds of windings and branchings down to the rocky ground of the glacier, and supply the stream which pours forth from the glacier gate. The gently vaulted surface of the glacier glistens and shines with the reflection of the sun's rays from the smooth, flooded ice. An infinite feverish trembling is spread over the whole bulk of the ice, so that a glimmering arises as of myriads of particles. It is quite easy to walk with a firm foot and safe tread over the shining, perspiring glacier; but if you do not tread firmly and take some care not to slip, you cannot be certain of not sitting down in the wet every two or three minutes. This strange vivacity, this humming, singing, rustling in the network of channels that spreads over the glacier's surface, lasts as long as the sun sends down its frost-dissolving rays. As soon as these sink behind the mountains, the little life grows dumb, the frozen death-like breeze moves over the icy desert and binds the trickling drops again into crystals, and before it is night, the noiseless silence of the grave is lying over this corner of the Alps.

There would be no difficulty in proceeding further were it not for a new splitting of the glacier, but this time not into fragments standing vertically upwards, but underneath. They are the celebrated "Querspalten," or crevasses, which cross the glacier up to a considerable height. Many of the Alpine "ice-seas" are so crossed and torn by these rents that travelling over them is next to impossible, or, at least, leads into a labyrinth from which it is a hard task to find the way out. There are examples enough, in which travellers with guides, in clear weather, in broad day, on glaciers scarcely half an hour

wide, both of whose banks were thus in the closest proximity, have so lost their way amongst the crevasses that they have spent many hours in finding the way out. Examples of accidents shall be mentioned in a following chapter "On Alpine Summits." The crevasses have generally at the upper surface a very long-drawn elliptical shape, whose two ends run out to sharp points. Their breadth and length vary strangely, according to the size and slope of the glacier; there are some which, at their first origin, can easily be leaped across, and others which are twelve feet broad and more. The breadth is generally in some proportion to the length, and some may be seen which run across the whole glacier from one bank to the other, and thus, in effect, divide it into two parts. Most of them thin out as they sink. A look into them generally reveals the same beautiful display of colour as in the ice-needles previously mentioned; in particular, the veined structure of glacier ice can be easily observed on their walls. The crevasses arise from causes similar to those which produce the glacier cataract; they produce a strong tension of the ice. The philosophers Hugi and Agassiz, who had huts built on the ice for the sake of special investigations, and stayed there for weeks, accurately observed the formation of crevasses. It was announced by a loud crack inside the ice, which trembled as though in an earthquake. Soon afterwards the rent appeared at the surface, like the crack in a window-pane, whose motion and extension could be followed by the eye. It was often, however, the case that immediately after its origin, the walls of the crevasse were separated by several centimetres. Their distance then steadily increased. It has been, on the contrary, observed that already formed broad and deep crevasses have closed and become homogeneous in colour, owing to the configuration

of the glacier bed. Generally, only a few are to be seen filled with water, because, on the one hand, many of them are connected with subterranean tunnels and canals, by means of which the glacier water is drawn off and sent to the principal stream; and, on the other hand, the structure of the glacier ice, differently from the common lake or river ice, permits an uninterrupted infiltration of the water. It is far more porous than the ice which is produced by strong frost from flowing water. The glacier ice, which, as we have already said, is formed by a series of transformations from the crystallised high snow, contains small lenticular flattened air-bubbles, and is crossed in every direction by an infinite number of capillaries, which receive and absorb immediately all the water from the surface of the ice. Professor Agassiz made experiments with dissolved colouring matter, and saw it quickly penetrate the whole mass of ice, as though it were an absorbing mud; within a short time it was coloured to a depth of fifteen feet.

By means of these cavities, peculiar to the glacier ice, the greatest and most variously directed activity is developed in it. The present forest inspector of the Canton of the Grisons, Herr Coaz (the first ascender of the Bernina, whom we shall have to quote again), had pitched a tent with a view to topographical measurements in the Val Morteratsch, near the bank of the glacier, and undertook excursions from it. The borders of the glacier are of very various formation; sometimes they are quiet, and on a level with the floor of the valley; sometimes they rise in vertical broken walls of ice; sometimes they overhang their banks, so that it is possible to penetrate for a considerable distance under the glacier. In many places the moraines are heaped up to form side walls; in others the soft Alpine meadow is in immediate contact

with the ice. He was once visiting a glacier cave towards noon on a cloudy misty day, which sank towards the floor of the valley from the edge of the Morteratsch glacier. He descended into a vault five or six feet high, and was observing the glacier ice hanging above him with its round or elliptical air-bubbles; water was trickling through some of them with a regular pulsation. At the same time he remarked in the ice little whirlpools of water some half an inch in diameter, which moved with great rapidity. As he had not previously remarked them, they must have arisen during his observations, probably owing to the warmth of his body. It might be safely assumed that the depression in which the whirlpool was turning was a bubble cavity opened by melting. To discover the channel which conducted the water into the whirlpool through the ice over the heads of the observers, he applied a lens, but could discover nothing. At length a small black particle of dust helped him to solve his doubts, by shooting out on to the surface of the overhanging vault of ice, and confirmed his assumption of a suspected small channel. It ran down steeply into the little hollow and produced the whirlpool. Shortly after he observed two whirlpools close together, which turned in opposite directions. As they penetrated further into the cave the ice became more free from bubbles, of a purer and darker colour. The walls of ice were quite damp; in places water was trickling from the vault; the glacier was in its state of greatest activity. Here a strange phenomenon especially attracted the attention of the observer; it was a small brook, scarcely a foot in breadth, which flowed over the head of the visitor, held firmly to the inclined and highly porous covering of ice. Such a phenomenon is uncommonly striking, as the water only half follows the law of gravity, and almost seems to despise it. He signi-

ificantly named it a "hanging brook." Further down a crevasse opened, through which a full stream of light penetrated from above, and produced the purest, gentlest, lightest blue in the crystal clear ice, such as it only preserves in the depth of the hidden glacier world. This opens to the inquiring spirit, as for the receptive understanding, far more than the first cursory view of a glacier would lead us to suspect.

To penetrate to the bank of a glacier is not less dangerous and difficult than the crossing the deep crevasses spanned by snow bridges. An incident related by Professor Forbes of Edinburgh may prove this by its example, and show at the same time how very dangerous is a solitary journey over glaciers. More will be said about snow bridges in the chapter on Alpine summits.

In the middle of September 1842, Forbes was visiting, from Chamouni, the lonely rock of Trélaporte, a promontory below the Aiguille de Charmoz. As it does not lie on the road by anywhere it is very seldom visited by the shepherds, who come up from time to time to bring salt to the sheep left to find pasture during the summer without protection. Forbes, busied in sketching the bold outlines of the Aiguilles du Dru and du Moine, sent his guide Auguste Balmat to fetch water to drink, which is hard to find, as the rocks of Trélaporte consist of masses of granite. After the guide had not returned for half an hour, and it might be feared he had lost his way amongst the wild rocks, the naturalist himself got up to look for him. In a short time he saw him coming with two boys from Chamouni, who had been on their way to the Jardin. They were leading a man who seemed to be completely exhausted and bewildered, and whose clothes were hanging down in rags. The guide Auguste was also very tired, for he had exposed himself to the greatest dangers to save

the stranger. The stranger, an American, who in the morning of the previous day had started alone for a walk on the Mer de Glace, had lost himself in climbing up the solitary slopes of Trélaporte, and spent the whole night on an almost inaccessible cliff. According to his story he had slipped in the previous afternoon, fallen over a rock, and would probably have been crushed at the bottom, had not his clothes stuck to some bushes in falling and thus interrupted his fall. He had thus reached a platform of rock, which, being surrounded by the most dangerous precipices, had become a hopeless prison for him. The night was not too cold for him to keep alive in terrible anguish, and when it became day, he had seen the two young men a long way off and called to them. The bold mountaineers had managed to climb so near to him by a long circuit that they were just above him ; but their common efforts would have been insufficient, if Professor Forbes had not, as though by the direction of Providence, come to this rarely visited neighbourhood and sent his guide for water. The guide, whilst searching for it, had seen the efforts of the two lads and had come up to them unsummoned. It was due to his courage, to his endurance and audacity, as well as to his rare physical power, that he freed the wretched man from a position in which even chamois would have been lost. Balmat related that, as he was clinging to an almost smooth wall of rock, he had felt his foot slip, as he bore the whole weight of the stranger, and had given them both up for lost, when he succeeded in catching a hold and stopping himself. After Forbes had strengthened them both with a little wine, he sent the stranger, whose brain appeared to be affected, down to Chamouni in company with the two lads, whilst he visited the scene of the accident in company with Balmat. His

elaborate description of it, shows that it was a platform of rock, overgrown with turf and bushes of juniper, a foot in breadth and a few feet long, which was shut in at the back by an overhanging wall of granite, and sank vertically in front for several hundred feet. It might almost appear a miracle that the unlucky man could have reached this place by slipping or falling; had it not been for the bushes which interrupted his fall, and in which rags of his torn blouse were still hanging, he would have fallen down over the platform of rock without touching it. He had to spend the whole dark night on this platform where there was scarcely room for a man, standing upright, without moving a foot, with an awful death by starvation or falling always before his eyes, without expectation or hope of safety.

The crumbling of the banks produces the moraines. Let us examine the picture of a glacier in our book (the motive of which is the middle part of the Gôrner glacier with the Riffelhorn, and Monte Rosa in the background, with the addition of the glacier gate foreshortened to give an instructive view); we shall see behind the region of glacier needles, long drawn lines of stone, which stretch far away in the perspective. These are the moraines or "Gandecker," called also "Gufferlinien." Whatever is split off, displaced, and crumbled from the mountain walls by heat and frost, rain and storm, falls on to the fields of névé (when it is in the higher regions) or on to the edge of the glacier, and moves onwards with its mass. The névé, like the glacier, has, so to speak, a repulsive power; they suffer no foreign substances to mix in their body; what has lain buried for years in the crevasses of the névé is brought to the surface of the ice by the melting of the surface, and the gradually elevating force of the motion.

Thus the blocks are raised. If it now happens that two glacier valleys unite into one bed, like the confluence of two rivers, so that the ice descending from two separate homes pursues one common path downwards, the two interior lateral moraines form one medial moraine, and show only one line drawn along the axis of the glacier; there will be as many moraines as there are lateral or secondary glaciers which pour themselves into the principal glacier. Our picture shows three central moraines, but the Görner glacier has in fact eight moraines, which are remarkable for sharpness and parallelism. The mass of the mountain *débris* here accumulated is so remarkable that one would fancy oneself standing upon a shoulder of the mountain itself. The central moraine at the *Abschwung*, formed at the junction of the Finster and Lauter Aar glaciers, on which the naturalists Hugi and Agassiz erected their hut for observations and measurements of several weeks' duration, is a wall of *débris* nearly 400 feet broad, and in places 30 feet above the level of the glacier. These moraines are, however, frequently only small rows of single stones, occurring like a thread of pearls, with small intervals, and running down the whole length of the glacier. These stones keep to their direction with remarkable precision, and often do not quite disappear when a glacier fall stretches across their line with its needles and colossal masses of ice.

Besides the proper moraines we meet with separate blocks of stone on the vaulted back of the glacier, like wanderers or hermits, which, as they have no similar material round them, give special opportunity to the action of atmospheric influences, in the formation of shapes of ice allied to the glacier needles; these are the so-called "glacier-tables." In the continual melting of the surface during the warm season, that part of the ice on which

lies a rough block of stone, a thick mass of gneiss or schist, is protected from the immediate dissolving influences of the sun's rays and warm wind; thus naturally, whilst the glacier melts all round, and the part of the ice covered by the rock is preserved, it stands up, as it were spared from destruction. The ice-bearer or post grows out like the foot of a round table, entirely above the level of the glacier, is constantly touched on all sides by the air of a slightly higher temperature, and takes a slenderer form, whilst the stone, resting on its pillar of ice, protects it from the energetic rays of the sun and its rapid power of melting. These glacier-tables, looking like gigantic toadstools, are not to be found on all glaciers, but still on most of the large ones. The finest are on the Unter-Aar glacier, where Agassiz measured some 8 feet high. On the Théodule glacier are stones 20 feet long and 6 broad, resting on a foot-stalk of ice so narrow that one would expect to be able to embrace it. There are many on the Liapèy or Durand glacier, in Val Hérémence, with stones inclined at an angle of 30° , and on the Pasterze glacier in the Tyrol. On the Glacier de Lechaud, Professor Forbes found a glacier-table formed of a splendid flat slab of granite 23 feet long, 17 broad, and 3 deep, and its beautifully veined delicate pedestal of ice reached a height of 13 feet at the end of August. When the prop becomes too weak, the stone slab loses its balance, it falls, and the process of melting begins all round it anew, whilst the icy stump of the destroyed table is completely dissolved by the atmospheric action.

In striking contrast to these huge fragments of rock raised above the glacier-level, and the already mentioned repulsive power of the glacier, is the sinking of smaller objects into the ice. We find withered leaves, blown up

by the wind, dead butterflies and beetles, or little stones on the glacier, which have sunk an inch or an inch and a half into the ice. That they are not brought down enveloped in *névé* from the heights, is shown by the sharp outlines of the hole, open above, which exactly correspond to the outlines of the object in question. Much as this fact contradicts the other phenomena, it may be explained. Bodies, in fact, can absorb a greater or less quantity of heat according to the greater or less depth of their colouring, black bodies absorbing most. It is thus intelligible that the radiation of the sun affects such black objects more powerfully than the white ice, which reflects the sun's rays, and these bodies, in consequence of the greater quantity of warmth received, radiate heat into the ice below and around them, thus causing it to melt. Precisely on account of their smallness they are completely penetrated by the sun's warmth; large slabs of rock, as in moraines and glacier-tables, are only heated at the surface, without being able to propagate the heat so far into their interior as to produce by it a melting of the subjacent ice.

A third phenomenon, allied to that of moraines and glacier-tables, accompanies them, which surprises us on a visit to one of the "*mers de glace*,"—the cones of *débris* and sandhills. They are simply caused by the inundation of stones, grit, and mud, owing to the rapid melting of the glacier's surface, so as to form little alluvial deposits. These, by their thickness, protect the subjacent ice from the sun's rays, whilst the glacier, exposed all round them to the free air, melts away; thus mounds like molehills are formed, which grow to a height of 12 feet, and have generally a circumference of more than treble their height.

All these strange rocky burdens borne on the glacier's back are transported by it to the valley, and of themselves

are one of the most striking proofs of the motion of the icy stream. The mass of ruins thus borne from the heights to the valley is very various, and can only be reckoned by the frontal moraines which have been deposited at the end of the glacier in the course of thousands of years. The most gigantic frontal walls are at the foot of the Glacier des Bois, in the valley of Chamouni, amongst which the latest of the great deposits arose in the year 1820. A grisly wilderness of stones of every size and kind has repressed all meadow cultivation, and a new forest-covered hill of moraine 6000 feet in length, called Les Tiges, shows what a single glacier may bring to the valley. The village Lavanchi lies on the eastern slope of the most ancient colossal wall of stones. One of the rocks brought down is so vast that it has a proper name, as an independent individual — “Pierre de Lisboli.”

The fact that the glacier moves and every year makes a determinable progress forwards or downwards is a modern discovery of science, known to the hill-folk centuries ago. Strange as the phenomenon may appear to the lowlander of a solid moving mass of ice constantly progressing over the hard ground, a level of ice remaining motionless in solitary banishment would be equally puzzling to mountaineers. The rate of motion of glaciers is determined by the slope and relations of its bed, and therefore very various. The glacier universally moves quicker towards its centre than at the sides, and at the top than at the bottom. According to the measurements of Agassiz and his companions, on the Aar glacier, the daily average motion was about eight inches from the month of July to September in different years. Professor Forbes found a still greater motion in some of the Mont Blanc glaciers. But no normal rule can be given,

because the influence of the mean temperature of the year is shown by experience to have a great effect. According to the observations of Ziegler on the Grindelwald glacier, with regard to its winter motion, this was feeblest in January, more marked in December, much more lively in February, and increasing still more in March and April. In general every glacier seems to be almost stationary during winter, and, on the waking of nature in spring, to resume its activity. But the motion of a glacier varies not only at its surface, but also according to the vertical depth, so that the greatest motion takes place on the surface, a less motion in the centre, and the least in the part in contact with the soil.

The theory of glaciers has caused very different opinions and deductions as to the nature of glacier motion. The oldest investigators, especially De Saussure, to whom the natural and physical history of the Alps owes so much, assumed a bodily sliding of the ice over the inclined ground; others, and amongst them the still older Scheuchzer, ascribed the principal progressive impulse to the expansion of the crystallised watery substances under the influence of freezing, and developed the expansion or dilatation theory. Professor Hugi, who had made acquaintance with the capillary tubes described above, assumed a process of universal saturation, as though the glacier sucked up watery particles like a sponge, and by their freezing a downward motion was produced. Others again would demonstrate an actual rolling over of the masses of ice. According to all investigations up to the present time, the downward pressure of the weight of the enormous masses of snow lying behind the glacier seems to provide the chief and increasing power of impulsion which keeps the stiff icy stream in motion. The yielding of the mass to the undulations of its fall, and on its front,

may give further cause for slighter motions. Finally, too, the greater tendency of the ice to yield, owing to the capillaries, may contribute to the whole phenomenon.*

Where these glaciers move in canals inclined uniformly to their ends, the mountaineer who travels over them has not much to dread. It is different with those glaciers which are formed high up, and, after keeping for a time on their way, suddenly lose their bed, because the rocks upon which they rest sink steeply downwards. These, which are called "hanging glaciers," break off in ruins at the fall, and are precipitated in glacier avalanches to its foot. Cultivation and human industry have naturally never settled at the foot of these unwearied discharges of ice, and the broken masses are cast harmlessly into waste ground. There are, however, cases enough in which such glacier falls have been the indirect causes of injury in inhabited places, and to those who dwelt there. The most remarkable case of this kind is the accident caused by the Gietroz glacier, or rather by the accumulated masses which fell from it in the Val de Bagne and the Lower Valais, on the 16th of June, 1818. This valley presents a very narrow gorge, five hours above Sembranchier, commanded to the south by a steep buttress of the Mauvoisin, and to the north by the Mont Pleureur, 11,400 feet high, whose foot forms a cliff 500 feet in height. Over this hangs the Gietroz glacier descending from the high snow regions. At all times of the year and almost every day, shapeless masses of ice fall from it into the valley, and accumulate into gigantic hillocks of ice under the cliffs, below which runs the wild stream of the Dranse. Between the years 1816 and 1818 the fragments of ice had increased to a

* This account of the glacier theory is of course extremely imperfect. It is scarcely necessary to refer to Professor Tyndal's admirable work on glaciers for a full account of the subject.—*Trans.*

degree never before known, and in the winter of the last-mentioned year the narrow vaultlike outlet was so choked that at last it froze in one mass across, and left no space at all for the Dranse. The icy dam reached straight across the valley, resting on both sides on the mountain walls, and had attained a height of over 200 feet. The water of the river, of course, rose higher and higher, and at length formed a lake half an hour long and 700 feet wide. The inhabitants of Lourtier, Champsec, Chables, down to Martigny, watched anxiously its continuous increase of volume. Its pressure became constantly greater and more violent, and it might be calculated that as the warm season approached the dam would not have sufficient strength of resistance to oppose a complete outburst. The inhabitants of many places made a formal emigration, flying at the beginning of the milder season with goods and chattels to the Alps. Engineers, especially Venetz, visited the place, and advised that a great channel should be hewn in the ice above the point to which the water had reached, so that if the lake still rose it might find a sufficient outlet through it; at the same time it was believed that the flowing water would melt the opening deeper and enlarge it, and that thus gradually the whole lake might be discharged without damage. Unfortunately, consultations and advice lasted too long. A tunnel 700 feet long had indeed been driven into the ice under Venetz's orders, which at first fulfilled its required purpose, and let off a considerable part of the lake without damage. But the hot June sun and the warmth of the water so penetrated and gnawed into the icy dam, that on the afternoon of the 16th of June it could no longer support the pressure, and gave way; a volume of five hundred and thirty millions of cubic feet of water rushed down the valley at once, with furious speed. Everything that lay in the way

of the hurrying unchained waves became their prey; the tearing flood overwhelmed whole villages, and more than five hundred houses in all; pines, slender and shaft-like as the cedars of Lebanon, struggled in the waves with blocks of ice as big as houses, and cannoned with a dull roar of thunder against the dislodged blocks of stone. Débris, pebbles, and mud covered the whole Val de Bagne and the Valais, down to the Lake of Geneva. Although all the inhabitants were hastily warned by signals of the awful event, thirty-four persons lost their lives. The damage was valued at a million of old Swiss francs. The evil, however, did not cease with this terrible accident: the very next year the dam had grown to an almost equal height, and threatened a repetition of the catastrophe. The engineer Venetz then led spring water, by means of long wooden troughs, on to the dam of ice, and divided one part of the ice after another by this warm water, which cut like a saw, so that the danger was averted without damage. Since that time the operation has to be regularly repeated every year.

A side-piece to the Gietroz glacier is the Bies glacier in the much frequented valley of St. Nicolas (Valais). It hangs at an inclination of 45° to the eastern slope of the colossal Weisshorn, and would come down with its whole mass if the frost did not fix it to the ground. The awful glacier falls of the years 1636, 1736, 1786, and especially that of the 19th of December, 1819, have shown that the weight occasionally overbalances this means of connection. The last fall destroyed, merely by the blast of air, the village of Randa, on the other side of the valley, on the slopes of the Grabenhorn. Houses and stables were thrown far away overturned, millstones were found a cannon-shot from their former position, roof-beams were thrown a quarter of an hour higher up into the forests,

the point of the church tower stuck inverted in a meadow like a wedge driven into the ground, cattle lay crushed after being carried several hundred yards through the air, and near a hundred houses were injured. Strangely enough, only few persons lost their lives in the catastrophe. The glacier has again so increased in mass since this last fall, that a similar event may be dreaded perhaps after no very long interval.

CHAP. XXIII.

ALPENGLÜHEN.

WE have reached the lofty goal of our journey — near 8900 feet high. We are standing on the top of the Faulhorn ; a golden July evening, saturated with sunlight, lies on the mountains round, and all nature seems to be drawing deep breaths of delicious recovery from the oppressive weight of the sultry heat. How grandly and boldly the giant snowtops of the Bernese Oberland rise up, ranging with indescribable clearness up to “the light-penetrated heaven’s blue, which surrounds the whole world with its gentle arms ;”—the broad rocky furrowed pyramid of the Wetterhorn, with its smooth breast of snow, the steep Schreckhörner behind, and their proud domineering neighbour, the solitary Finsteraarhorn, against which leans the whole chain of the Viescherhörner ; then right in front the mighty rock-face of the Eiger, and, looking over his shoulders, the snowy hood of the Monk ; and then, in her shining dress of silver, the majestic Jungfrau, with her troop of satellites, and, far away to the right, the whole endless labyrinth of points and cliffs of the boundary Alps towards the Valais. Every group stands out from the rest, defined by sharply drawn lines. We have a broad view over the mustered veterans of the Bernese Alps. Warm life is still poured over the majestic panorama. Below, where the châteaux of Grindelwald lie imbedded in their

home in the hollow, evening has drawn in, and cast its blue peaceful veil over the valley of Lütschinen.

One more look to the west. The effect of light is growing weaker — the pure blue ether is losing its intense colour, which marks off the contours of the snowy points with such distinct lines ; it gradually passes into an indefinite airy ocean varying between blue (or perfect transparency) and yellow misty patches of rays. This again is reflected over the Alps lying beneath this part of the horizon, the Alps of the Wildhorn and Oldenhorn groups, and on the mountains of the Engstligen and Kienthal, so that the interest of this part of the view is much diminished. Further again to the right, the eye sinks to the shining levels of the Lake of Thun, behind which rise the Alps of the valley of Frutigen and the Simmenthal, with the straightened corner buttress of the Niesen. The masses gradually melt more and more into each other ; a warm evening haze, the yellow ochre-coloured sun mists, envelope the lofty points, so that the outlines lying in front of each other are hardly to be distinguished. The further our view reaches, the more vague become all the forms of the landscape ; a glistening golden ocean of mist has swallowed everything, and the undulating “middle-land” and the distant Jura are bathed in its faint waves.

What contrasts in the colour that is spread so lavishly over hill and valley ! And yet we have scarcely passed over half the great majestic panorama. For the light is accumulating to the same degree over the place where the sun is about to set, and spreads away towards the northern horizon. Comfortable Brienz, with its coffee-coloured houses, lies below in the quiet valley ; flat shadows have stretched far across the basin of the lake, and are beginning gently and softly to climb up the mountain shoulder towards us. The bright “forehead of the evening’s sky”

has for more than an hour passed from the dwellers in the valley. Solemn evening peace rests over the houses, grey mists creep up from the pinewoods, and embrace the twilight mountain slopes like soft songs of slumber.

Suddenly well-known sounds rise up from the depths, but distant and faint, sounding with such spiritual tenderness, as the harmony of the spheres. It is the blower of the Alp horn on the Giessbach below, who is performing his solitary evening tune for late guests. The echo comes across to us from the Brienzer Rothhorn; we listen long to the melancholy tones, which touch our souls with longing.

The warning of our guide interrupts the melancholy silence that held us all. We turn and are astonished at the change which has come over the giant edifice of the high mountains during our short look round. The softly rising shoulder of the Wergisthal Alp, where, on our ascent yesterday from the Scheideck, we passed through a flowery sea of fiery bright Alpine roses, which a few minutes ago was still lighted up by the sun, rests now in blue shadow; but the Eiger, the Jungfrau, and the whole mountain chain, have a rosy tinge on their beds of snow and glacier slopes, whilst their rocks are every second taking a deeper colour. It is the beginning of that sublime spectacle, the "Alpenglühen." The sun, a rayless scarlet ball of fire, is resting on the back of the Chasseral, and colours all objects still within the power of his rays with a deep purple tint. Our clothes, linen, even our faces, appear of a burning orange, and the grey blouse of our guide is a violet carmine. The dark mountain shadows climb the Alps with giant steps, and paralyse all the colours and forms which, a few moments ago, made all the rocky forms stand out so clearly; but the intensity of the Alpine glow increases equally. Its fire burns brighter

every moment. Now the sun, which seems to have expanded to a gigantic, hitherto unknown size, disappears like a gleaming coal in the west. Now it is a hemisphere, resting its broad base on the Jura ; now a flat segment, a long rounded arc, looks over the mountain chain twenty leagues away ; now a narrow line — a star — a shining point. Farewell ! great herald of blessings to the world ! It has left us ; but high up on the icy points of the loftiest Alps it has kindled its beacons, which glow like red melted metal. It is a dithyramb of flame, which nature sends up joyously through the approaching night to the friend of its life.

This is not a phenomenon of every day's occurrence. There are years in which the full real Alpine glow is a rarity. What causes this deep, burning, glowing colour, which gives its distinctive name to this grand spectacle of nature ? Other objects may reflect the rays of the dark red setting sun, even with a heightened warmer light, according to their original tone of colour ; but they never reach that intense, transparently hot carnation which tinges the snowy points of the high Alps, under the combined action of different circumstances, on a favourable evening. It may be the three following causes which produce the Alpine glow, — the nature and density of the bodies which absorb and again radiate the sun's rays, the height and position of the different summits, and the striking contrast in colour between the twilight below and the sharp illumination of the high points.

The névé is a mass transparent at the surface, formed by countless legions of small independent crystal particles, whose minute surfaces of reflection, scarcely visible to the naked eye, receive the rays of the sun, and reflect them again according to the directions of their faces. This

power of reflection is so great that many of the little crystals, which are overshadowed by a small projecting grain of snow, and thus not immediately subject to the action of the sun's rays, receive their splendour at second hand, by the rays proceeding from other neighbouring reflecting particles. Thus the evening glow penetrates the half-transparent surface of the *névé*, and collects an accumulation of rays, a developed mass of light, such as is concentrated in no other objects except transparent water and vapour gathered into clouds. We may see how extraordinary is the power of reflection of the small crystals of which snow consists, when the wind raises the light snow-dust, and it wanders sparkling like diamonds in the breeze.

The second special circumstance which produces the Alpine glow is to be sought in the high position of the snow relatively to the depression of the sun. That meteorological process which causes the evening red in the atmosphere gives their glow also to the *névé*. When we stand on a high mountain, we see the sun sink as a red rayless ball, whilst it disappears only as a deep yellow from the inhabitants of the plain, though in its full glory of rays. The cause of this visible change of colour depends upon the vapours in the lower strata of the atmosphere being rapidly condensed in the cool of the evening, which, like all watery vapours, allow principally the red end of the spectrum to pass through them. Now, the longer the line which the sun's rays have to describe through the atmosphere filled with dense watery vapour, the more intense appears the red colour: thus, the higher the point lies which is illuminated by the setting sun, the more powerful and fiery is its illumination under a cloudless sky. But these causes would not be able to produce the intensity of the Alpine glow, were it

not for a third co-operative cause depending upon an ocular deception, namely, the contrast in colour between the dark blue of the earth's shadow, in the profound depths of the valleys, and the glowing colour of the *névé*. The most brilliant plays of colour result precisely from contrasts between sharp illumination and want of light. A firework burnt by day is dead and dull, because light can be as little relieved against light as white upon white, or black upon black; it is the dark background of night which gives their sparkling splendour to rockets.

The glow which spread round the Alpine summits has disappeared, a cold livid pallor spreads over the whole broad snow mountain. It is a strange frosty view. The passage from the full splendid ornamentation of fiery illumination and sharp form to this icy, barren blue grey indefiniteness, is too sharp and sudden, a likeness of death. But it is not long before light returns to the colouring. Look towards the place of the sunset. A boundless field of the most fiery evening red flames up and pours a warm gentle tone over glaciers and snowy wastes. Once more a light rosy hue touches them, but it is faint,—faint as the last smile of a dying friend.

Sunk in deep peace, the vast majestic realm of Alps surrenders itself to the soothing dream of the day's charms. All the humming, buzzing life in the air is dead: the impudent beetles that bounce against you, the light-winged tribe of butterflies, the legions of shameless penetrating stinging gnats, all that is cradled in summer in the warm air of day,—all have sought their quiet still sleeping places beneath flower-bells, leaves, or in the clefts of bark and of splintered rocks. The moths awake from their day-dreams, and count the seconds with their feathery feelers till their heavy flight is to begin; owls and bats make their airy rounds; and where animal life seems to

have ceased in the night, the plant life rises in more luxuriance.

But a cold cutting wind breathes over our mountain-top. We take refuge in Peter Bohren's hospitable inn, at the warm stove, the steaming soup, for outside it is deep night, and the starry vault shines over the whole universe — a hymn of praise to the Almighty Creator.

CHAP. XXIV.

ALPINE SUMMITS.

THE ascent of lofty, difficult, and rarely reached Alpine summits is something quite different in nature from the journeys to the Rigi and Faulhorn undertaken to satisfy a noble curiosity.* These ascents belong to the *élite* of the travelling world. Only thirst for knowledge and bold inquiring spirit—that “holy impulse to trace out, in the service of science, the framework and life of the earth, the secret connection of all created things,” which encouraged such men as Forster, Alexander von Humboldt, and Bonpland; as Clapperton, Barth, Vogel, and Livingstone; as Franklin, Ross, Johann von Tschudi, Burne, the brothers Schlagintweit, and other heroes of polar and equatorial expeditions,—and which drove the bold De Saussure, Hegetschwyler, Hugi, Forbes, Agassiz, Desor, to the mountain summits stiff with ice, and all but bare of organic life—or, finally, the free manly pleasure in the overpowering charm offered by the strange and wildly sublime—can excite to such dangerous undertakings. They are deeds for which courageous decision and firm will, great bodily strength and endurance are required,—

* The difficulty and danger of high mountain ascents, and consequently the impropriety of undertaking them “without some scientific object,” are considerably exaggerated in this chapter. If the truth were known, I suspect that many of the so-called scientific ascents have had pleasure and excitement for their object much more than science.—*Trans.*



ALPINE SUMMIT.

which cannot be carried out without deprivation and willing abnegation of accustomed comforts. They are also actions which require as well intellectual as material preparation. Without a conscious purpose, without study, and scientific support, such expeditions become idle, worthless, and resultless risks, which can only produce the empty boast of "having been up there." What K. Müller says so strikingly in his views of the German Alps about travelling in general; that knowledge of nature and of the secrets she reveals to us can alone give full genuine enjoyment in travel; that thousands yearly return from the Alps without having learnt to know, because they were deficient in the internal vision; is true a hundred fold of those who spend time and money, trouble and risk to life, to be able to boast of an ascent of Mont Blanc.

And, finally, a mountain ascent of this kind which seeks a point above 10,000 feet high, ought to be undertaken with great care and well grounded knowledge. In those dead dreary fields of ice, bare of all vegetation, where for miles no human help or protective shelter is to be found, where no hospitable welcome greets the weary traveller, in those awful deserts all that belongs to the most pressing wants of life, meat and drink, fuel and covering, must be carried up. To cross abysses, climb precipices, hew steps in smooth walls of ice, and wander with as little danger as possible over slippery fields of snow, there is need of ladders and ropes, axe and crampons, the carriage of which together with compass and telescope, thermometers and barometers, maps, drawing and cooking apparatus, is an appreciable hindrance to progress. If a single traveller ascends Mont Blanc, for which three days are necessary, he has need of a complete regiment of four guides, each of

whom has 120 francs and a Napoleon "trinkgeld" when the journey is over, and to provide for the needs of five persons, five additional porters are necessary, each of whom has 50 or 60 francs for the journey, so that the cost amounts to between 900 and 1000 francs.*

There are as many guides in the Alps as sands on the seashore, but very few who possess the necessary stuff for central expeditions. Not only bodily strength and local knowledge are required, courage, prudence, a quick eye, and above all, presence of mind must accompany the other necessary qualities of a guide. Woe to him who, ignorant of the mountains, is in charge of men who have no mountain craft; he is as good as lost. But there are guides, chamois hunters and wild hay cutters by trade, who have so sharpened their sense of locality by long practice, that in places untouched by an alpenstock, where their foot has never trod before, they still can at a glance see the way, through labyrinths of rock and icy wastes, which leads to their object. A guide gifted with such sure talents for locality was Maduz of Matt in the Kleinthal of Glarus (a Suabian by birth), who, with a warm sense of natural beauty, was especially careful of his clients and thoroughly skilful. When Herr Studer of Berne and M. Ulrich of Zürich first ascended the Monte Leone in the Valais, and Professor O. Heer of Zürich (a well known botanist and entomologist) first ascended Piz Linard in the Lower Engadine, they took Maduz, who had never been there before, and yet he guided them safely and comfortably up. Another guide, who accompanied Hugi and Agassiz for many years, and made pilgrimages with them to the Finsteraarhorn, Jungfrau,

* Two (not three) days at most are spent on the ascent. The charges for guides, porters, &c., represent not what is really in the least useful or necessary, but what the system at Chamouni formerly contrived (and perhaps still contrives) to extort from unwary travellers.—*Trans.*

Schreckhörner, and other points of the first rank, and always led the whole expedition, was the courageous Jacob Leuthold of Im Boden, Haslithal. We shall hear of them both again in the following pages.

The highest point in Europe, Mont Blanc, was ascended amongst the first by D. Paccard of Geneva, accompanied by Jacques Balmat of Chamouni, in the year 1786. De Saussure, with eighteen guides and porters, followed him on the 1st and 2nd of August in the next year. Since that time it has been often and without any results ascended by brave men, and now hardly a summer passes, in which it is not attacked by many strangers, especially Englishmen. The first attempts at ascending the higher summits of the German Alps were much later; the first was the Ortler Spitz, by orders of the Archduke John of Austria, by the mountain officer Gebhard and the hunter Joseph Pichler, in September 1804-5. The Jungfrau was next ascended by the brothers Meier of Aarau, on the 3rd of August, 1811, and on the 3rd of September, 1812; a third ascent was made by six peasants from Grindelwald on the 10th of September, 1828; and a fourth on the 28th of August, 1841, by Professors Agassiz, Forbes, Desor, and Duchatelier; and finally a fifth on the 14th of August, 1842, by Herr Gotlieb Studer of Berne. Since then it has never been visited *for scientific purposes*. At the time of the first ascent of the Jungfrau took place the first attempt at an ascent of the Finsteraarhorn, the highest point in the Bernese Alps, by MM. Meier, which was afterwards attempted with great trouble by the naturalist Hugi of Solothurn, and in the years 1828-9 only two guides reached the highest point on the third ascent. Herr Sulger of Basle first succeeded in August, and on the 6th of September, 1842, in reaching the top twice and

planting a flag on it. Since then this point has never been reached.* The Schreckhörner are so inaccessible that the highest point has to this time never been reached; on the 8th of August, 1842, the naturalists Escher von der Linth, Girard, and Desor tried their luck, but only reached the top of the Gross Lanternaarhorn. The ascent said to have been made by the Englishman Eustace Anderson is doubted, as no proofs have been given of it.† The Wetterhorn (or Hasli Jungfrau) was long considered inaccessible. On the 28th of August, 1844, MM. Desor, Dollfuss, and others reached the southern point, called the Rosenhorn, and two days afterwards the guides Bannholzer and Jaun are said to have reached the highest point. Since 1845, when MM. Fankhauser and Dr. Roth of Berne reached the middle point of the mountain on the 9th of July, it has never been visited.‡ All other ascents of important summits of the Alps have taken place quite lately.

Attention was early paid to the Monte Rosa by M. Vincent, 1819, Zumstein, 1820 and 1822, and Ludwig von Welden, 1822; but none of these reached the highest point, but only the lower points of the nine-pointed colossus now called after their names; Vincent Pyramide, Zumstein Spitz, and Ludwig's Höhe. After vain attempts to reach the Höchste Spitz, made by Professors Ordinaire and Puiseux, 1847, Professor Ulrich of Zürich, and Studer of Berne, 1848 and 1849, and the brothers

* It has been several times reached by English travellers; amongst others, for *scientific purposes*, by Professor Tyndal.—*Trans.*

† See Mr. Anderson's account in "Peaks, Passes, and Glaciers." Mr. Anderson did not ascend the Schreckhorn. Possibly some of his guides or porters may have said that he did so.—*Trans.*

‡ Mr. Wills made the first ascent of the northern and most difficult point, with Ulrich Lauener and others. See his "Wanderings in the High Alps." It has since been reached by several Englishmen, amongst others, by the translator.—*Trans.*

Schlagintweit, 1851 and 1852, the Messrs. Smyth of Great Yarmouth succeeded in reaching the highest point in 1855. We shall several times return to it in the course of our narrative. There were similar attacks on the Tödi in Glarus, and many others. We will describe the course and adventures of such an expedition somewhat nearer.

The sleeping huts improvised for passing the night are amongst the most necessary preparations for glacier journeys. These are of course only necessary when the ascent of a mountain occupies more than a day ; as is the case in the Mont Blanc, Finsteraarhorn, and Jungfrau, or when a longer stay in the higher plateaux of snow and ice is necessary for the sake of scientific inquiries, observations of temperature, and glacier studies. It is then either a vaulted, niche-like, overhanging rock on the edge of the accumulations of ice and snow, or a cave which keeps off weather, and must act as a bivouac. As, for example, the Russian Du Hamel, formed on the Grands Mulets, 9000 feet above the sea, in the ascent of Mont Blanc, or the English philosopher Forbes, in 1842, in the recesses of the Mer de Glace, below the Tacul, 7000 feet above the sea ; and in the same year the famous mountaineer and lover of Alpine scenery, Herr Gottlieb Studer (of Berne), at the foot of the Wannehorn, near the Aletsch Glacier (about 8000 feet above the sea), on his ascent of the Jungfrau ; or an actual hut is built of rocky fragments, on the moving foundation of a moraine, or even on the firmly frozen *névé* itself. Such barracks, which in their *naïve* style of architecture remind one of the early attempts at building by uncivilised people, and compared with which the most miserable chalets are generally comfortable dwellings, were erected by De Saussure, on the Col du Géant, at a height of 10,000

feet ; Hugi, on his attempted ascent of the Jungfrau from the Roththal, and afterwards on the Unteraargletscher, Loetschengletscher, and at the foot of the Finsteraarhorn. Their form and construction are of antediluvian simplicity. Four side walls are generally constructed of slabs gneiss and mica, laid on each other, forming a long rectangle on the ground, a few feet high, and covered with sods of grass (where it is to be had) and cushions of moss torn from the stones. A hole left on one side forms the portal of the building. Over this rough fold alpenstocks are laid horizontally at intervals to serve as rafters, and a long woollen covering spread over them, and held fast by heavy stones, forms the roof.

The cabin built at the Abschwung, on the Aar glacier (five hours from the Grimsel inn) in 1840, for Professors Agassiz, Carl Vogt, Desor, Nicolet, Coulon, and Pourtalet, and afterwards restored, gained European celebrity. These philosophers humorously christened it "Hôtel des Neufchâtelois;" it was inhabited for weeks in several summers, and received many visits from travellers. Professor Forbes of Edinburgh and Mr. Heath of Cambridge spent three weeks in it in 1841. Desor gives humorous pictures of this dwelling. The icy floor of the glacier was coursed with slabs of schist, over which were spread a thick layer of withered wild hay, and waxed linen cloth to keep off the damp. That was the common mattress of the six philosophers' bedroom. Bedclothes and woollen coverlets completed the arrangements, which thus gained a roughly comfortable appearance. A kitchen and dining-room were established before the sleeping-room, also under the roof of the huge black block which supported the whole building. A cloth hung across a fixed staff served for curtain and door. Below a neighbouring block were the magazine for provisions

and cellar. When dinner time approached, the hungry philosophers collected, and though there was little change in the normal dishes of rice and mutton, cooked by the guides, they all confessed that a dinner in the open air, on a table of gneiss, in front of the Glacier Hotel, was a luxury. The cup of coffee and cigar after dinner, immediately under the Schreckhörner and Finsteraarhorn heightened the enjoyment of lively discussions. An hour later each went to his inquiries. The evenings were short. They went to sleep, like fowls, directly after supper, because the temperature fell quickly to freezing point. All the numerous brooklets that trickled over the glacier by day disappeared, one after the other; the murmur of their waterfalls ceased, and utterly soundless deep silence sank with night over the broad dead icy level. The brave mountaineers, however, suffered nothing from frost; the sheepskin coverings used in the Grisons, and especially in the Valaisan Alps, produced such warmth, that it became almost unbearable to remain under them, in spite of the cold without. Hence these truly "golden fleeces" form one of the most necessary parts of the baggage of a glacier expedition for every traveller in the High Alps.

The ascent of unusual summits of the Alps would not be a task worthy of so much consideration for a man of strong muscles, and free from giddiness, if some continuity prevailed in the parts to be overcome, if the glacier and its crevasses, the névé and its chasms, the high snow, in its depth and consistency, remained the same, year in year out, and skilful guides with local knowledge could therefore tell confidently beforehand which would be the best way, at what times the greatest exertion of strength would be needed, and the most threatening danger be encountered. But experience

shows that the change of aspect of a region never passes through such constant varieties and transformations as in the loftiest Alpine regions. Where hollows and deep basins of snow are to be seen to-day, perhaps next year hills of névé will be towering; where this summer paths across the slopes of névé rise gently and easy to be passed, rents in the snow and ridges of rock will appear the year after, if there is little snow and long continuance of heat, and thus the best guides may be completely thrown out. On account of such uncertainties (not to mention the possibility of sudden storms) an expedition must always be prepared for the worst.

Cautious mountaineers have the fundamental rule — to keep as long as possible upon the “aberen,” that is, on the turf or rock free from snow, because the foothold is generally safer, climbing less troublesome, and generally progress more rapid and better than on the element of snow and ice, strange and hostile to man.* It is about the same contrast as between travelling on dry land and water. Only on decaying crumbling stone and steep slopes of débris, and in descending, when one generally chooses the most direct line, the snow is preferred.

The crevasses generally present the first important hindrances to direct and rapid ascent. There is scarcely a considerable Alpine point to be named whose base is not surrounded by an icy stream, or from whose flanks one more or less formed does not slide. Turning the crevasses, when it is possible to see across the glacier, is certainly tiresome, but generally not dangerous. There are, however, uneven glaciers, with swelling mounds, such as the Glacier de la Vanoise (between Mount Cenis and

* This rule cannot be said to be even generally true. When a glacier is not very much crevassed, it usually affords safer, easier, and quicker going than rocks.—*Trans.*

the Val d'Isère), where it is impossible to keep to any given direction. Wandering over a glacier with such crossing crevasses may lead into the most dangerous positions, because from the absolute similarity of the crevasses to each other it is as hard to recognise the line which leads to one's object as to find one's way back. If mist overtakes unskilful people in such a labyrinth they may consider themselves very lucky if they get out again.

Very probably the travellers who mysteriously disappeared on the Gries glacier (pass from the Valais to the Val Formazza) towards the end of August 1849, the brothers Leonard from Paris and Dr. Wolfrost of Frankfurt, about whom the fable was long circulated that Peter Zymbach, the former host of the Grimsel, had had them robbed and murdered, fell victims to such a misfortune. The later in the summer such regions are visited the more crevassed they will be found.

No less dangerous than the crevasses are the unperceived snow-bridges which overvault them. They arise in continuous snowfalls by the same strange aggregation of single snowflakes and crystals of ice which, even in the lowlands, forms overhanging hoods in gardens or on solitary pillars and posts, or produces the "snowshields" that cause avalanches in the mountains. When the whole glacier is covered with fresh snow, such snow-bridges cannot be at once recognised. If, meanwhile, it has rained on the snow-bridges, or the sun has weakened the upper layer, so that this condenses as it sinks and freezes again, one can pass without danger; a snow-bridge a foot thick, if its span is not too great, will bear a man. To provide against their frequent yieldings in glacier walks, the guides knot themselves and the travellers together at distances of some four paces with a rope passed round the body, in order that if one sinks the

others may easily drag him out. A neglect of this measure of precaution has already caused many melancholy accidents. In the year 1821, the young clergyman Meuron, from the Pays de Vaud, fell into a crevasse 121 feet deep, on the top of Grindelwald glacier, and was drawn up dead some time afterwards, after turning off the stream which flowed below the glacier, and buried in the churchyard at Grindelwald. This glacier received its latest victim on the 10th of June, 1860. In the same way Dr. Bürstenbinder, of Berlin, lost his life on the Oetzthal glacier, in the Tyrol, in 1846, and a Russian gentleman on the Findelen glacier in 1859. In July 1836, the guide Michel Devouasson fell into such a crevasse on Glacier du Talèfre, near the Jardin, but worked his way painfully up by the help of his pocket knife, with which he cut steps in the wall of ice. His knapsack, which he lost on the occasion, was found in bits ten years after, 4300 feet further down, at the foot of the Couvercle, rejected by the glacier. In the same way a chamois hunter who had fallen into a crevasse on the Rosegg glacier saved himself; the walls of the crevasse, over sixty feet deep, being too far apart, he tied his alpenstock to one leg and thus, stretching across the crevasse, slowly worked himself up.(!)

In 1803 the Chamois hunter, Peter Moor of Gadmen, fell into a crevasse on the Trift glacier, but was lucky enough to lodge on a projection of ice where he could hold on. The rustling waters murmured in the awful depths, and a cold icy air breathed upwards from the abyss. Strangely enough, he could hear the cries of his comrades sharp and clear, without their being able to understand his loud cries in answer. To save their unfortunate friend the others went four hours off to the first houses, and did not return till near evening with the

necessary materials for help. After the unlucky man in the icy cleft had fastened the rope that was thrown to him tightly round his body, and had been drawn up some feet, the rope broke, and he fell again on to his ledge. The rope now was too short, because half of it was below. Nothing could be done but to perform the four hours' journey there and back by night to come with a stronger rope next morning to the unfortunate buried alive, and save him after sixteen hours of anxiety. Still stranger is the following case: On the 7th of July, 1787, Christian Bohren came over the Upper Grindelwald glacier, between the Wetterhorn and the Mettelberg, in company with a certain In. Aebnit, when suddenly a snowbridge gave way under him, and he fell into a chasm sixty-four feet deep. He broke his arm and dislocated his wrist, but did not lose his senses. Luckily he found an opening below the glacier, which the Weissbach, flowing from the Wetterhorn, had excavated. He crept toilsomely through this tunnel, 130 feet long, along the course of the water, under the ice, and in this way escaped the fate of being starved to death.

De Saussure, as he descended from the Aiguille du Midi in 1786, suddenly broke through the snow with both feet, but so that he remained sitting on a saddle of ice, while his feet hung down freely into a deep abyss. His guide, Pierre Balmat, close behind him, had the same accident. He called out quickly, "Keep quiet, sir, don't move the least, or you are lost." Pierre, without moving a limb, called to the other guide, who had not sunk, to search quickly which way the crevasse ran, and what was its breadth. Meanwhile he conjured De Saussure to remain as quiet as possible, because the slightest motion would infallibly cause the fall of both into the abyss. When the second guide had carefully reconnoitred the ground,

and discovered the shape of the crevasse, he laid two long alpenstocks crossways before De Saussure, by whose help he rose carefully from his unsteady seat, and saved himself, and then stretched out his hand to save Pierre in the same way from his dangerous position. Invention is never quicker than when the utmost need is pressing. This appeared, to finish the subject of snow bridges, on Hugi's return from the Finsteraarhorn. The snow was so weakened in the afternoon by the warm temperature that every moment one of the company sank up to his breast. Since the crevasses crossed the way, often ten or twenty feet broad, and were generally vaulted over with a thin weak crust of snow, the excellent guide Jacob Leuthold ordered them to lie flat on their stomachs, and thus to pass the awful abysses slipping or wriggling, breaking the danger by distributing the weight of their bodies over a greater surface. Herr Weilenmann practised the same precaution on his ascent of Piz Corvatsch and Piz Lat, in the Bernina group.

When the mountaineer has crossed the length and breadth of the glacier, it frequently occurs that he meets with unexpected difficulties in his passage to the firm rocks, when he has again to tread them. In consequence of its greater capacity for warmth, the rock generally so melts away the border of the glacier close to it, that there is a gap of four, six, ten, or even twenty feet between them. If no point can be found from which the traveller can reach the rocks, made slippery by the melting water, by a successful leap, he has no way but to be let down by a rope.

In many cases, however, it is not necessary or possible to get on to the said rock; but there is a gradual and direct passage from the ice to the snow. This is generally less crevassed on account of its granular and

less coherent structure, and from its greater capacity for motion and bending. There are snowfields over which it is possible to pass for many hours without meeting with the least hindrance, which are therefore especially favourable to rapid progress. But there are others which, in consequence of the uneven and rent bed of rock on which they rest, are crossed by rents and chasms, known under the name of Fernschründe (Rimayes). Terribly beautiful glimpses open into such great caves in the névé. They are often of immeasurable depth, lighted up inside by a transparent azure so magical and tender that one is reminded of Kühleborn's enchanted palace in La Motte Fouqué's "Undine." The points of ice hanging from the cornices and ridges, like stalactites in limestone caverns, increase the marvellous appearance, and when they reach to the bottom of the precipitous hollows, they appear like the supporting pillars of vaulted cathedrals, and are well fitted to present all kinds of fabulous arabesques to the fancy. The most inconvenient crevasses or mountain ascents are those which occur at the foot of lofty ridges, from which the slopes of névé sink steeply down. They surround most mountain summits, and imitate their figure in corresponding outlines. When a mountain has several terraces of snow, there is generally a "bergschrund" near each terrace, and every summit may have two or three of them. Sometimes, when much snow falls, the "bergschrund" is filled with avalanches, and on this ground years of much snow are favourable to ascents of the High Alps.

The greatest difficulty to be overcome generally consists in the opposite wall of ice or snow being considerably higher than the standing point on this side. When the guides are prepared for such an occurrence, and have brought ladders with them, the crevasse is

generally easy to cross. Such a ladder is formed of a thick, tough pole, some twenty feet long, through which are driven cross pieces to serve as steps. But it happens that a mountain expedition has to get on without ladders, and then a boldness which despises all danger frequently produces the most adventurous actions. Herr G. Studer relates some of the most interesting. On his ascent of the Mont Velan, undertaken with Herr Weilenmann, at the end of August 1856, after crossing the Glacier de Broz, he came, at the foot of a huge pillar of rock which rose from the névé straight towards the highest point of the mountain, to a yawning "bergschrand." The guides André Dorsat and Pierre Morey crossed the crevasse with accustomed boldness at its narrowest point, and climbed along the opposite ice wall up a standing-place, made secure by a huge projecting rock. From here they threw down a rope's end. Herr Weilenmann was the first to attempt the giddy ascent, passing the rope round his right arm, and allowing himself to be pulled over the abyss, whilst he steadied himself by holding his alpenstock in his left hand, with its iron point driven firmly into the ice. Herr Studer followed in the same way. Still more complicated was the passage of the "bergschrand," on the ascent of the Grand Combin, by the same two observers in 1858. The enormously deep crevasse was only some two feet broad; but the opposite wall of ice rose vertically to a height of seven feet more. The guides Felley (of Lourtier) here took counsel quickly. Two long alpenstocks were bored firmly into the opposite wall of ice at a height of some five feet above the opening of the crevasse, to serve as steplike props for the feet. Then Benjamin Felley let himself down on his hands and knees as near as possible to the crevasse. His brother Maurice stood on his back and

shoulder, used this living staircase, which gradually rose, and the two sticks, as supports for his feet, and then digging his hands deeply in, swung himself actively and vigorously into the slope of snow above, which was not so hard and less steeply inclined, till he had gained a safe place. When he had reached it, the rope was thrown to him ; a second guide tied the end round his body, and managed to climb up more easily by its assistance. The others were drawn up in the same way together with the baggage. Only the last guide had to perform the manœuvre rather more awkwardly, as he had not the props of the two alpenstocks, which had been already drawn up. On their return, they had to reach the level of snow, seven feet below them, by a bold leap ; one of the guides had leapt first, and received the others with open arms.

Such crevasses have often proved impassable, and a complete ascent of the mountain-top has therefore failed. This fatality interrupted the late courageous climber, Hoffmann of Basle, on the Tödi, in 1846. A snow crevasse, sixty feet broad, below the highest walls of snow, between the Tödi and the Piz Rusein, repulsed him and his celebrated guides, 344 feet below the top.

Before the ascent of high mountain points had become so popular as it is now, wonderful legends were told, even in good books, of all kinds of bodily ailments to which travellers in such heights were exposed. Sometimes the air was represented to be so extravagantly rarefied that breathing became almost impossible. Then blood was said to pour from the mouth, nose, and ears of the storming parties on mountain tops ; congestion, pressure on the breast and stomach, and all kinds of inconveniences were represented as evils unavoidable by every one who penetrated to heights of 10,000 feet and upwards. Even

a mountain sickness, corresponding to sea sickness, was invented with its symptoms, irritations, remissions, crises, &c., and a formal doctrine of medical remedies was opposed to it. The mountain climbers of our days know nothing of such sickness. Here and there a man may bleed at the nose, but certainly only in consequence of the increased circulation caused by the effort of the ascent; inconveniences may happen to people who are especially liable to disorders of the stomach, and weariness is a very natural consequence of the bodily effort when one is walking with great exertion for six or eight hours uphill in rarefied air and amongst many dangers. The only really existing phenomena which exercise some influence on the body and its normal functions, are the scarcely to be avoided burning thirst*, with an absence of decided appetite, which mountaineers very significantly call thirst-hunger, and the inflammation which threatens the eyes, and may end in the so-called "snow blindness," if the organs of vision are not guarded by blue or grey spectacles against the constant intensely burning influences of the dazzling reflections from the snow, after a journey of hours over the *nevé*. But this radiation of light from the snow attacks not only the eyes, but every exposed part of the body, especially the face, when not protected by a coloured veil. These effects are so marked that a complete burning of the skin, as in the most powerful heat of the sun, takes place, followed by blisters and wounds. Veils certainly interrupt the view, and considerably increase the heat by interfering with freedom of breathing. To refresh themselves, the guides make snowballs and place them in their necks, a means of cooling which does not hurt a strong man in such re-

* It is easily avoided by a little training. — (TRANS.)

gions, where, besides, body and soul are unfettered and independent of external influences.

We return to the mountain walk. The snow crevasses are not the last difficulties to be overcome ; new ones accumulate, which may be dangerous under certain circumstances. Such are ice slopes. At considerable heights the sun or the warm wind melts the surface of the snow on steep slopes frequently to a depth of several feet. The water released by the warmth from its crystallisation penetrates the snow and freezes again at night. Hence arises a surface of ice, which, to make a lame comparison, resembles the smooth ice of the lowlands, only that it is far more thick, compact, and massive. To climb such ridges of ice demands much labour, trouble, and patience. Here the axe must help to hew steps in the tough material. It wants a good instrument directed by a skilful hand ; if it once falls from the hand, which easily grows stiff, there is a break in the calculation and a blank in the lottery. The passage of a party under such circumstances, where step after step has to be made, levelled, and ensured, is then slow, wearisome, and freezing. On Studer's first ascent of the Rinderhorn (11,415 feet high, near the Gemmi), 400 such steps had to be hewn in an icy slope, a loss of several hours. It is the rule of mountain-climbers to ascend such an artificial staircase as straight as possible, so that the face remains turned to the ice. The foot treads far more safely with its point than with its side.

Such steep ice slopes are most dangerous when freshly fallen snow masks the smooth surface of ice. There is no want of stories to make one's hair stand on end in the chapter of slips on the snow, when the new-fallen layer has set itself in motion with the party of travellers over the concealed pathway of ice. Hugi, on his second attempt on the Finsteraarhorn, nearly lost his life by such

a slip, when the determined Leuthold seized him by the arm and saved him at the last moment. The most fearful accident of this kind is that which frustrated the complete ascent of Mont Blanc by the Russian philosopher, Hamel. He had left Chamouni on the 16th of August, 1830, in company with two English savants from the University of Oxford, Messrs. Dornford and Henderson, with the most skilful guides of Chamouni (Coutet, Mat. Balmat, Favret, Jules Devouassou, &c.), and many porters with comforts, provisions, and mathematical and physical instruments; had passed the night at the Grands Mulets, and next day was already in favourable weather near the Petit Plateau, under the Dôme de Gouté, from which the top of Mont Blanc can be reached in two or three hours. The guides were already wishing him luck, saying that all difficulties were passed, no more dangers or crevices to be feared, that no expedition had ever been carried out with such good luck, so quickly, and such freedom from accidents. The whole expedition was in the best hopes, and already saw itself at the end of the journey. Hamel had written notes, which he was about to fasten to a strong pigeon he had brought from Sallanches, which he would then release to see whether it would again find its mate in the dovecot at Sallanches, some five hours off in a straight line. The savants were already rejoicing over the place of honour which the piece of protogene broken off with their own hands from the top of the highest of European mountains would occupy in the cabinets of London and St. Petersburg; in short, every one was enjoying his own favourite thoughts and plans. Each marched behind the other, following the first guide who made the steps, and who changed with the others from time to time to relieve himself. No one complained, though all were a little tired by the effort. "I was still

the last," says Herr Hamel, in the *Bibliothèque Universelle*. "I generally walked twelve paces and then stopped, and took fifteen breaths, resting on my alpenstock, as I felt that I could proceed in this way without being tired. I was looking at the footsteps through my green spectacles and the veil which covered my face, when I suddenly perceived that the snow was giving way under me. As I thought that I was only slipping, I tried to support myself with my alpenstock on my left hand, but in vain. The snow accumulating and rising on my right threw me over and covered me, and I felt myself being dragged downwards with irresistible power. At first I thought that I was the only person affected; but when the snow accumulated so as to stop my breathing, I supposed that a great avalanche was coming down from Mont Blanc and pushing it before it. I cried out, but apparently in vain. I saw my companions no more. I expected every moment to be crushed by the mass. I still constantly endeavoured to turn myself round as I rolled, and applied all my strength to divide the snow, in which I was, as it were, swimming. At last I succeeded in freeing my head, and I saw a great part of the slope in motion; but as I was tolerably near the edge of the part which was sliding, I endeavoured with all my strength to reach the firmer snow, on which I was at last enabled to get a firm footing. I now recognised the real danger. I saw that I was on the brink of a crevasse which bordered the slope. At the same time I saw Mr. Henderson's head appear out of the snow still nearer to the crevasse, and somewhat further on Mr. Dornford with three guides, trying with desperate efforts to gain firmer ground as I had done. They fortunately succeeded, but I could nowhere distinguish the remaining five. I still hoped to see them creep out of the snow, when Balmat called to us that there

were some of us in the crevasse. This news startled me like a thunderstroke ; — five men buried alive, and that owing to me and my friends' persuasion. Dornford threw himself upon the snow with the wildest gestures, and Henderson appeared for a moment so overcome that evil consequences might be expected. The infinite feeling of joy which electrified us when on examining one point we saw the snow move first a little, then more decidedly, and after a few moments one of those we had supposed lost came out, is not to be described. An exulting hurrah greeted him, and was redoubled when we saw shortly afterwards another fight his way up. Our hopes of seeing the other three appear were already bright — it was in vain." After a long, toilsome, but ineffectual search, as far as was possible in a complete want of shovels and such implements, the whole party, after being so near their object, turned back in the deepest melancholy, as the guides declared that new snowslips would certainly follow these in the places through which they had still to pass. At nine in the evening the caravan reached the valley with their terrible message. But those three victims were sleeping the sleep of death in the icy cellars of Mont Blanc.

It is not, however, only these snowslips allied to ground-avalanches which threaten the traveller at considerable heights, but also the avalanches properly so called, which are detached overhead and may bury or kill one. A very celebrated place of this kind, known to all mountaineers, is the so-called Schneerose or Schneerunse on the Tödi. It is a little rocky valley about half an hour long, under the so-called "Yellow Wall," which is enclosed by huge walls of ice, cut off vertically at a considerable height. Great blocks of ice fall from them at intervals, which roll with fearful bounds to the lower end of the

valley. As a passage through the Schneerose is always accompanied with more or less danger, those who ascend the Tödi always hasten at their best, to pass this awkward place as quickly as possible. Such a cannonade of fragments had nearly crushed Dr. Hegetschwyl, of Zürich, the well-known botanist, and monographer of this colossal mountain. He was making a third attempt at ascending the Tödi on the 12th of August, 1822, accompanied by six friends and guides. When they had reached this terrible gully, three persons of the expedition were already standing completely protected under the shelter of overhanging rocks, and the guides were busied in guiding the last with ropes through the most dangerous point of the gorge, when there was a thundering murmur through the desert. A glacier fall roared down from the height of the ice-laden ridge. The anxious cry of the guides filled the air — a rush of snow from all sides, then an awful stillness for two moments. Then came a louder roar; enveloped in a spray of ice as if in mist, little fragments of ice rushed over the precipice and through the gorge right upon those who were still there. As these pressed close to the rocks and clung to them, the stream passed over them without any injury of importance. Those who were standing in safety remained in stupified, painful anxiety for two more awful moments; then the stream ceased, and the rescued men recognised each other with lively calls. The fragments of glacier were completely crushed by their deep fall, and thus rendered almost harmless.

The arsenal of the high Alps is however not yet finished by a great deal. The nearer we get to the desired points, the more the sum of dangers and hindrances accumulates. The next thing to be feared is the

projecting "Schnee-weheten" (or snow-cornices), which form broad, hollowed, deceitful curtains over fearfully deep abysses, over faces of rock sinking vertically for several thousand feet, and without any mechanical prop. They are only held up and supported by the frost binding together the drifted needles of ice, and the coherence of the snowflakes. A trifling additional weight may loosen such scaffoldings of snow, which project into the air like roofs over the cliffs, and send them down. Herr Weilenmann observed some on the Gufferhorn (in the Adula group) which projected without support more than thirty feet, and deserved to be called models of bold snow architecture. It is necessary to take good care not to go too far out on such overhanging cornices. Great difficulties again are provided for the mountain-climber in the decaying rock, the crumbling fragments loosened by erosion and the action of atmospheric influences, either because the foot can get no hold on them and is in constant danger of slipping, or through their giving way above and causing a hail of stones. Thin needles of rock, which stand up like the spires of a Gothic cathedral, and have to be climbed round on the edge of precipices, are amongst the smaller troubles of the last hours of the march.

The last actual central point, the utmost culmination, is in many Alpine summits the hardest nut to be cracked. Many an expedition, prepared with the utmost care, has completely or partially failed close under the domineering point, because it was only perceived too late that the attack had been made upon the bulwark from the wrong inaccessible side (this was the case in the attempts on the Monte Rosa in the year 1855), or because the storming party was deficient in that truly mysterious coolness and grim resignation, as well as in the muscular

power, necessary to encounter such risks of life and death. Some examples will give a sufficient illustration.

The last passage to the top of the Bernina Spitz (13,345 feet high) consists of a sharp icy ridge, which sinks towards the valley of Rosegg, steeper than the ridge of the steepest church-roof, in fact almost vertically, for a good two thousand feet, and on the other side looks towards an amphitheatre of glacier. In the ascent of this gigantic mass on the 13th of September, 1850, Herr Coaz passed the saddle with his two guides by sliding along it astride. On the Gross Glockner, the path leads to the actual top over a saddle of rock thirty-eight feet long by only three or four inches wide, lightly covered with snow; the Austrian Major Sonklar Edler von Innstädten passed it with three companions and five guides, half riding, half creeping, on the 4th of September, 1855. The ascent to the Monte Rosa is similar, but still more complicated. Johann zum Taugwald, on the second ascent after that on the 14th of August, 1855, passed the ridge scarcely a foot wide, levelling the snow ridge by treading it down, free from giddiness, as though in a flat field. Herr Weilenmann, the adventurous mountaineer, followed him (by his own confession) holding his breath, and not without a shudder, but still upright. The summit of the furthest point was not even then reached; they now had to cross a rocky platform only a few paces in length, but covered with smooth shining ice, which was gradually inclined towards the wall of snow that sinks steeply towards the Görner glacier. When this too was passed, an almost vertical chimney-like gully had to be climbed, leading directly to the highest summit. In the ascent of it there projects a prominent slab of rock, which cannot be passed without the help of skilful, firm, and courageous companions. Peter zum Taugwald squeezed himself like

a chimney-sweeper between the walls of the cleft, his cousin John mounted on his shoulder, and thus this last was enabled to get his arm round the projection. He hung over the chasm for a second. When he was once up, the others mounted quickly, by the help of the rope. A helpless keeper of archives, who is often mentioned in this expedition, had to be hoisted up like a bundle of goods by a crane, with the rope fastened round his body. The unlucky man had shortly before, as they were passing the giddy ridge, put his arm out of joint, and, after long fruitless tugging and pushing, the guides, who did not possess any particular surgical knowledge, had succeeded in replacing it. A similar passage is that over the Roththal-sattel on the ascent of the Jungfrau ; it requires a firm tread, eyes accustomed to abysses in order that they may not be liable to giddiness. This mountain, however, leaves its most terrible moments to the very last point. A sharply cut ridge leads up to this, whose breadth varies from six to ten inches, whilst the slopes on both sides have an inclination of from sixty to seventy degrees. When Professors Agassiz, Forbes, Duchatelier, and Desor had reached it on the 28th of August, 1841, they thought that they would never be able to get further. Jacob Leuthold, however, maintained the contrary fearlessly, and to prove it took off his knapsack and went forwards, so that he was on the left side of the snow ridge, whilst he had the sharp edge, in the most literal sense, under his arm, and his stick was fixed on the right side. He thus went slowly and carefully along the precipice, treading down the snow as much as possible to a path, to make the way passable for others. In the attempted ascent of the Schreckhorn, by Professors Escher, Von der Linth Girard and Desor, in which, however, they only reached the top of the Great Lauteraarhorn, the party was un-

expectedly stopped as they were going along the edge of a rocky "comb;" the path was cut off from the main body of the mountain by a vertical notch ten feet deep, over which the summits appeared a few hundred paces further. This notch itself showed a sharp ridge of snow, such as has been several times described in the last few pages. Whilst they were still consulting whether to let themselves down by the rope or to turn the hindrance, the guide, Bannholze, without having himself tied, sprang at one bound down to the snow saddle. A general cry of horror!—they thought he was lost. However, without hurting himself, he descended into a sitting position on the snow saddle, and without attending to the calling, praying, and cursing of the other guides, he ascended the opposite point, reached its summit, and beckoned to them to follow. One after the other was let down by the rope, and the whole caravan followed the courageous man without accident. A final difficulty awaited them close to the summit. For some fifty feet, the ridge is so narrow as to be scarcely eighteen inches broad, while on both sides yawn nearly vertical precipices some 4000 feet high. Here the most courageous guides did not dare to go upright, but crept along the place, with eyes gazing straight before them, like quadrupeds, until they reached the desired summit.

To conclude with the ascent of the Finsteraarhorn. Hugi, on his third attempt at the ascent of this highest point of the Bernese Alps, had reached the high snow slopes on the 10th of August, 1829, which are to be seen so plainly from all good points of view in Northern Switzerland, especially the Faulhorn. In order to reach the central rocks in the highest summit of the snow and of the Horn itself, a literally hanging ice slope had to be passed. It could only be done by hewing steps. The

guides Leuthold and Währen set to work at once, struck their feet firmly into the hewn steps, allowed them to freeze on a little in order to stand firmer, and then went on cutting. It was a neck-breaking moment to see them hanging to this wall of ice. The dangerous work was done at last, and the place had to be crossed. Leuthold came to fetch Professor Hugi across, but told him plainly that if he slipped, salvation was impossible, and that he, on account of his own safety, would not even dare to give him a helping grasp of the hand. The end of many attempts was that not a single man of the whole expedition (amongst whom were many well-prepared mountaineers) dared to cross the ice slope. Leuthold and Währen alone reached the giddy top.

The moment at which one reaches a celebrated summit after unspeakable trouble and risk to life, has always something startling, almost solemn ; it is a moment of high feeling, when all round in almost endless chain stretches a far-extended horizon of mountain forms and valley basins. There lies spread at our feet the noble mighty world of Alps, ridge beyond ridge, top beyond top, and as the eye of a mighty ruler looks at his accession over all the peoples, nations, and races that will henceforth follow his guidance, here too there is a spiritual taking possession, a muster in the service of intelligence. The expanded mountain-world opens his own journal for the much travelled mountaineer, the recollection of his summer pains, pleasures, enjoyments and deprivations; friends of earlier days beckon to him from all sides, whom he recognises and greets, and his eye passes rapidly over all the known heights, passes, and river-beds. There too it meets on its way forms of reverend, proudly erected elders with silver summits, rising well above the crowd, on which it rests thoughtfully ; it knows them without at once recog-

nising them. Map, telescope, and guides are called to help. "Ah, old fellow, you are there too? How different you look from this side! I always have seen your solemn face from the other side, as you brood over your stony streams, and to-day you give me a stolen look over your shoulder." So our eye sweeps quickly round the points and summits of the giant ridges, glides down to the deep imbedded valley hollows, and over glistening river veins, till it returns to its starting point, to call over its roll after thus settling its bearings. And still more is it an elevating sensation, when it is a point where a man's foot has trod but seldom or never before; this is a still more sublime inauguration than the other, brought about by human minds and hands. Why does the account run through all the newspapers when at length an Alpine summit, long known to all the civilised world, drawn in innumerable maps and panoramas, and named in books, has been ascended for the first time? Because it is a repetition of Columbus on a small scale; because the bold men have added a building stone to the great temple sanctuary of science. All fears and privations are forgotten, the glacier crevasses and névé chasms with their deceitful bridges, the giddy abyss, and the crumbling slope of débris, lie like fallen enemies behind us, and our heart rises in exultation, and beats more strongly as though closer to God.

Still more, how is this feeling strengthened, when, as was the case on the first ascent of the Tödi in August 1837, the fearless mountain-warriors, climbing for a long time through mist, and hindered in their view all round, suddenly discover, as the grey covering veil is rent, that all the surrounding summits are lower than that on which they are standing, and that the long-sought goal is reached at last. So it chanced to these iron mountaineers as they pressed on as true as steel; Bernhard Voegeli, a chamois

hunter of sixty, and a wild hay cutter, with his son Gabriel, and the bold Thomas Thut, who all three lived in the Obbord mountains, behind the village of Linththal. All the expeditions that had started for this mountain with the greatest preparation had not succeeded in their object, and in the whole valley of Glarus it was considered an undisputable fact that the Tödi was inaccessible, as are still the Matterhorn, Dent Blanche, and Weisshorn of the Valaisan Alps.

The ascent of such a high summit, through all the hindrances and dangers that we have counted up, is very seldom successful, if the weather is not remarkably favourable to the undertaking and the air quite clear. Days are rare, on which the temperature is tolerably mild at heights over 12,000 feet, and a long stay on them comfortable or even endurable; the temperature even of the warmest summer days generally varies within a few degrees above or below freezing point. De Saussure found it at 28° in the shadow and 30° in the sun on the top of Mont Blanc; Hugi, on the Finsteraarhorn, at 1 P.M., at 31° in the shadow, and 32° in the sun; Agassiz, on the Jungfrau, at 3 P.M., at the end of August, 26° in the shadow; Coaz, on the Piz Bernina, on the 13th of September, at 6 P.M., at 39° . Some cases certainly of an extraordinary height of temperature are known. Thus on the Tödi, in the middle of August, Herr Dörler found the temperature 45° in the shadow at 1 P.M., and 49° in the sun; Zumstein, on his attempted ascent of Monte Rosa, found it 50° at a height of 14,894 ft. (whether in sun or shadow is not mentioned); and Weilenmann, on Piz Linard, at the beginning of July, at 11 A.M., found it even 70° in the sun on the south side. The mountain climber, however, pays in general but little attention to the small degree of warmth in the air; Agassiz'

companions danced on their passage of the Strahleck, and rolled like boys in the snow; the guides tried a "Hosenlupf" (bout of wrestling), and Bernhard Voegeli, sixty years old, stretched himself on the snows of the Tödi and was soon snoring comfortably. In general, mountaineers boast of an elasticity peculiar to the air, the freshness of which extinguishes even the greatest fatigue; they complain, however, with equal unanimity, of the great dryness of the atmosphere, which causes a peculiar stiffness in the skin and in other objects, which in consequence seem to slip very easily from the grasp.

A second agent, which considerably interferes with enjoyment, is the generally very slight transparency of the air below. High up it is so remarkably clear that the heaven's blue towards the zenith looks almost black or like dark polished steel; distant mountains appear, as seen from Mont Blanc or the Monte Rosa, almost of a deep yellow colour; and even the fields of snow take a yellowish tinge. On the contrary, the depths of the valley seen from such high points waver through the overlying mists till they become almost invisible. Only in the clearest weather can the neighbouring Alpine chains be clearly distinguished from Mont Blanc, the diameter of whose panorama is some seventy leagues. Further down everything grows more and more misty, till it disappears into entire vagueness. Meanwhile, according to the position and immediate neighbourhood of the summit, the view downwards and to the distance undergoes great changes. Studer describes this admirably in his glacier journeys: "The view from the Jungfrau is rather sublime than beautiful. It has an almost overpowering effect upon him who reaches the summit for the first time, and to whom it is revealing the colossal,

almost mysterious forms of its panorama. It is deficient in variety and charm. No blue lake rejoices the eye—for it looks down so steeply upon the Lake of Thun, that in colour and character it resembles a mournful mountain tarn between barren treeless mountain heights. The pleasant level country is too distant to reveal its charms. The sad grey, which covers it like twilight, melts into the dim vapour, which hovers formlessly over the vast horizon and permits neither form nor colour to be recognised. There extends a world of torn glaciers, snowy valleys, and variously torn ridges of rock or glacier, bordered by the colourless depressions on the misty horizon, above which we sit enthroned in strange solitude, and which is illuminated by the broken gleams of a faint sun in the black-blue firmament. The Tödi, which overlooks all Eastern Switzerland, offers an immeasurable panorama; it may be said that it shows only too much. The single disappears in the whole, and there too the distant hollows disappear in misty vapour, and the huge realm of Alps shows a few isolated sublime forms of groups, which enchain the eye. The Bernese Alps and the Bernina are too far off to produce a very imposing impression. On the other hand, the view from the Mont Vélan gains its great charm by the sublime and picturesque appearance and varied character of the only mountain groups visible. The particular forms repay one's trouble. The eye has not to be wearied to decipher a confused labyrinth of monotonous mountain chains; each has its special beauty, and one can scarcely satisfy oneself with gazing at the sharply defined beautiful forms of the various summits that strike up all round. Looking up to the great heads of Mont Blanc and the grand Combin, their impression of mighty size is overpowering. And yet the widely panoramic view shows

the loftiness of the standing place, and our glance can proudly command a thousand mighty summits which bend before it. Many fables are told in old descriptions of travel of the stars being seen to shine on such extraordinary summits in the mid-day; all the modern mountain climbers have nothing to say to this."

Amongst the most original devices are the plans by which the mountain climbers of different times and nations correspond with each other and telegraph to the inhabitants of the bordering valleys. Whenever a point has been scaled for the first time, its conquerors leave some sign of their presence behind them, as the old Romans left their "*hoc iter Cæsaris*." When the expedition consists only of herdsmen and of vigorous dalesmen, or of lovers of Alpine climbing who wish to measure their physical strength against such a colossus, because year in and year out it has been gazing down into their windows, they build a little pyramid by collecting fragments of rock as a "*promemoria*" for future travellers; the first business of the passionate mountain climber, when he gets to the top, is to search in the "*stone-man*," to see if there is not some note or account left by former travellers. To preserve such correspondence, destined for future times, the wine bottles emptied at the top are generally used. Thus the bottles intended for the depths of dark cellars, which have slept through many a changing moon in the depths of the earth, are now chosen out to serve as a practical confirmation of the cheerful "*post nubila Phœbus*"—after night cometh light. They who have hitherto been the bearers of strong drinks, now serve the spiritual fluid of human thought, and become the messengers of greeting between persons wholly unknown to each other. The page torn from the journal with the names of the ascenders, dates, and notes about

temperature, view, adventures, &c. (not without a confidential joke or two, especially after the wine has raised the mental barometer), is placed in the bottle, which is tightly corked and placed in the middle of the stone-man, safe from storm, rain, and snow. Weilenmann found in such a bottle, on the Monte Rosa, with an envelope of greetings and notices, some broad black and red silk ribands, left by the brothers Smyth of Great Yarmouth. (The Schlagintweits had reached a point only twenty-two feet below the highest.) He cut off little strips, of which he afterwards sent portions by letter to the Smyths as proofs of having followed them. Such deposits remind one of the custom of the middle ages of leaving in the foundation stones and turrets, documents and coins for distant unknown generations.

When, however, the mountain-climbers have prepared for a celebration of their ascent, flags wave from the summit, in sign of having taken possession, which can be recognised from below with a telescope (or Italian field-glass, as the mountain peasants call it). They are generally improvised standards, red streamers tied to a stick fastened in the stone-man, or, as in Coaz's ascent of the Bernina, the white cross of the Federation on a red ground, which flew triumphantly over glaciers and snowfields. But as such trophies seldom survive the storms and soon fall away in the rain, or (as that which Weilenmann found on the Piz Linard) are splintered and singed by the lightning, Hugli had one planted upon the Finsteraarhorn, of iron wire covered with cloth, which was observed through a telescope from the Grimsel, from Berne, even from Solothurn (a distance of twelve geographical miles). The most original flag, the work of the invention of the moment, was placed by the Schlagintweits on the Monte Rosa, where, in the absence of the required materials for a flag,

they fixed a shirt—which was perhaps surpassed by the one which Studer fixed on the Rinderhorn; there, too, a flag was wanting when the march began, and the host of the solitary Schwarenbach inn could only manage it by devoting an old waistcoat to be the sport of the winds.

As already stated, the climbers are followed from the valley by good telescopes, and it sometimes happens that when at length the longed-for flag is fluttering merrily on the top, the discharge of cannon announces the success of the expedition to the inhabitants of the valley. It is in accordance with the general laws and conditions of acoustics that those on the top can hear the signals of joy, as the waves of sound, cast back by the surrounding mountain wall, must pass upwards, whilst pistol shots on such heights which rise above their neighbours, from want of catacoustic reagents, disappear almost without effect, and are therefore inaudible in the valley. In general absolute, still, solemn silence, interrupted by no sign of life, is an almost terribly characteristic mark of these points, which lie in eternal sabbath: only when storm is roaring round the tops, the air is stirred sighingly by the pulses of the wind, and long-drawn, howling disharmonies vibrate in a wild series through the mournful solitude.

At these heights organic life has disappeared as a normal phenomenon. It is rare to find the tracks of chamois in the snow, and as rare to see one of the birds which builds in the lower snow region. Every now and then an eagle or "Lämmergeier" circles round a neighbouring peak and interrupts the dead silence with its long-drawn, shrill cry of "Pfi" and "Hiä." The bodies of small creatures are frequently found, that is, of the insects which belong to the valleys, and are borne up here by a whirling draught of wind, soon to find their death on the snow. Herr Dürler, during his meal on the icy top of the Tödi, saw a butterfly

(*Papilio brassicæ*) flutter feebly past, having just been blown up by the storm into these fields of death. Withered leaves of beech and sycamore are often found on the snow from eleven to twelve thousand feet high, but always, in consequence of their greater warmth, sunk to a depth of a few lines, with sharply marked outlines in the snow. The vegetable kingdom has still, here and there, solitary outposts; the *Arctica helvetica* and *glacialis* still appear at heights of 10,500 feet in rocky places, the latter with its fiery-red forget-me-not star enlivening a little the death-like wilderness. The *Poa alpina* var. *frigida*, and on the Schreckhorn even the *Ranunculus glacialis*, have been found at heights of 12,000. A few mosses venture up here, but very sparingly, and, as the last representatives of the vegetable kingdom, perhaps, a couple of lichens, such as *Parmelia elegans* and *muralis*, *Cetraria nivalis*, and on the top of the Jungfrau the one called in consequence *Umbilicaria virginis*.

We have already partly described what it looks like on these farthest culminating points of our earth. The summits of Mont Blanc, Tödi, Mont Velan, Cima de Jazzi, &c., present soft, round, vaulted, snowy cushions on a broad base, affording perfectly safe resting-places. The Galenstock (11,840 feet) displays a softly rounded cupola of snow towards the west, but on the east sinks suddenly and almost vertically downwards for some thousand feet. The top of the Gross Glockner, in Tyrol, is an uneven rocky space of chloritic schist, giving room for twelve persons at the outside. The southern point of the Schreckhorn (eighty-five feet lower than the higher northern, still unscaled, summit) has a surface of some four square feet, in shape of a bow or semicircle, with its convexity towards the north. On the other hand, the top of the Finsteraarhorn is formed by an undulating ridge, some

twenty feet long, and a foot or a foot and a half in breadth, sinking steeply on both sides. The Jungfrau presents a similar form; it falls in a hard snow ridge, like the roof of a tent, at an inclination of some 60° or 70° ; with a breadth of some six to ten inches, and the icy roof of the great Rinderhorn is everywhere so awfully sharp that the boldest mountaineer would be unable, from the steep slope of the ridge, to ascend it astride or to slide down it. The Bernina affords just room enough for three persons to stand close together, and the Grand Combin runs into an absolute snowy point, upon which one dares not venture. We find thus an abundant variety of forms, both of those improvised by the snow and ice, which are remodelled every year as they melt away or accumulate, and of those which take a fixed shape in rock. Troublesome and dangerous as it is to climb such a point, it is just as hard to take leave of it. It is a parting, perhaps for ever, from a fair sublime world, far above the petty pursuits of man. Retreat is often surrounded by still more difficulties than the ascent. For though guides and travellers are now certainly better acquainted with the road than before, their strength is partly exhausted, the surface of the snow has become softer, moister, and more yielding by the effect of the day's warmth, and climbing down walls of rock is far more troublesome and requires more care than climbing up, because one always has to seek for the firm footing below, which, in the opposite case, is visible at once. It happens, too, that the sun sometimes removes the traces of the upward path, and this clue is lost on the descent. Again, towards the afternoon, glacier brooks furrow the surface and make the path unusually slippery. How important these little veins of water, which fall with a loud roar into the glacier crevasses, may become for the careless or exhausted

traveller, is shown by an anecdote which Herr Weilenmann relates on occasion of his Monte Rosa tour. One of the Englishmen who were of the party, slipped in such a glacier brook and disappeared entirely. The guides sprang after him with a cry of horror, and caught him by his clothes as he was being washed down into a deep funnel thirty or forty feet broad and filled with water. The man, *horribile dictu!* had put on goloshes ("Gummischuhe"), and hence had no firm tread.* It is possible to slide down in a standing position over snowfields, holding the alpenstock behind, with the rapidity of a skater. It requires practice. Beginners make ridiculous exhibitions at first; but, as in everything, practice makes perfect. Daily struggle with the elements on the high Alps gives not only boldness and confidence, but their extraordinary skill to the guides. It is almost incredible with what safety and ease the mountaineer passes the most dangerous places, carrying heavy burdens. When Hugi, on his Finsteraarhorn expedition, could scarcely get on, owing to an injury to his foot, Leuthold took him up *nolens volens* on his back, and hastened with him down the glacier, whilst storm and night were approaching. The other two experienced guides, Währen and Zemt, emulated him in carrying their master: Hugi says, it was incredible to him how these men, without a stick, holding their burden with both hands, sprang over crevasses in the twilight, where all was deceitful and uncertain.

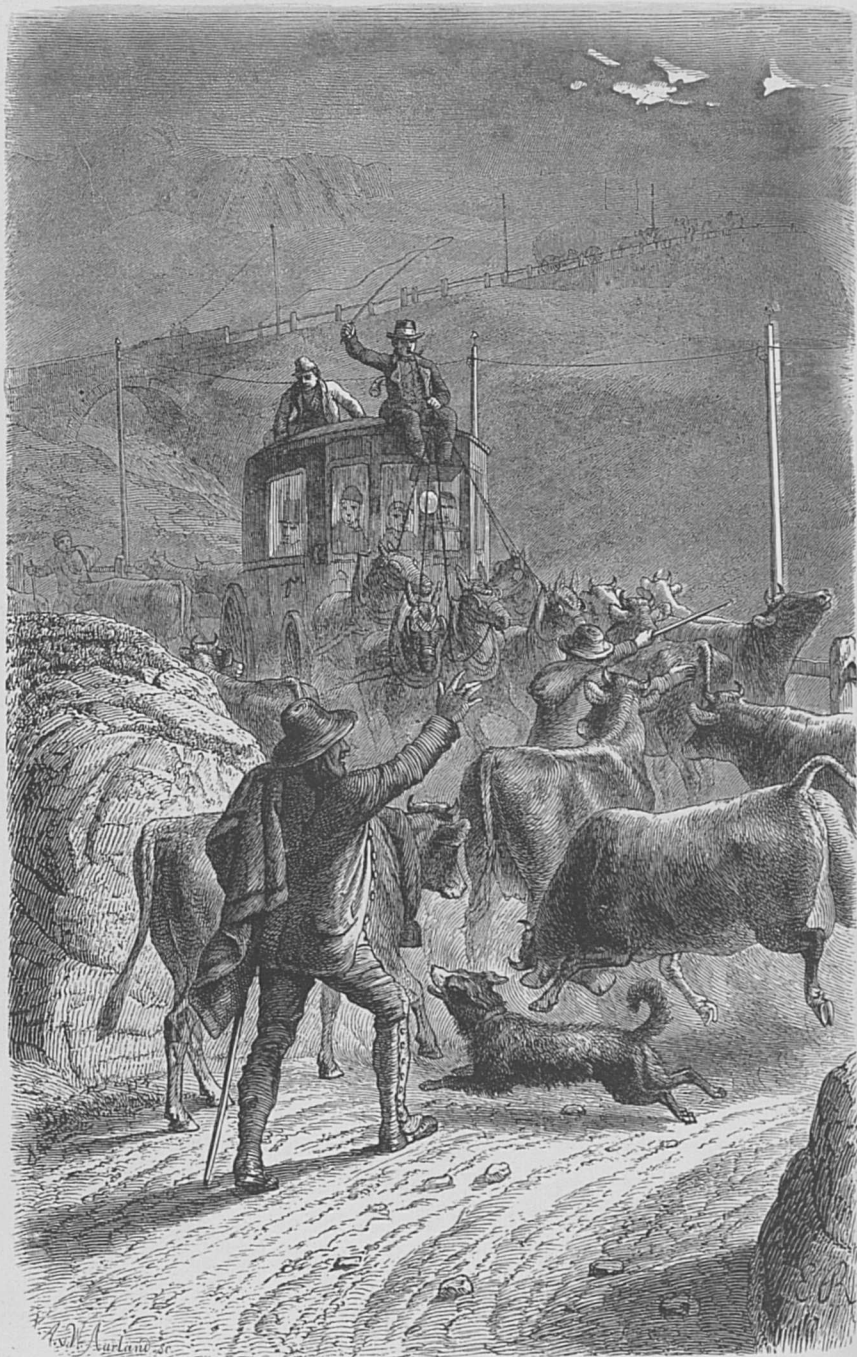
We have already given examples of the audacity with which the guides venture upon breakneck leaps; here is one more that will illustrate their courage in another way.

* The unfortunate gentleman to whom this misfortune occurred, had lost his baggage, boots included, on the railway, and had gone straight to Zermatt notwithstanding, and very pluckily climbed the Monte Rosa in this most inconvenient apparel.

Got. Studer, on his return from the Jungfrau, had let his hat fall into a deep crevasse, which sank without a break, with surfaces of ice as steep as the steepest tower. The crevasse grew narrower further down, whilst the opposite wall rose vertically out of the darkness covered with icicles. The guide, Bannholzer, who was annoyed at the loss of the cap, called out at once that he would see where it was, and, spite of all dissuasion, had the rope tied round his body, and let himself slide down into the awful depth. When he had got some way down, having got a footing on an ice pillar that threatened to give way every moment, he saw the lost cap lying still some way below him. The rope held by the two men above was not long enough. The foolhardy Bannholzer untied himself and got further down. After an anxious pause he gave an exulting cry. He had got his prey, and came up again to daylight. Although he had been to a depth of at least 100 feet, he said that the crevasse continued to an unfathomable depth.

It is an enviable day's work, when the lover of nature has got back in the evening, without injury, with his spirits raised, rich in experience, and with an increased treasury of knowledge, and has returned to human habitations as a distinguished guest; it is a pleasure and a consciousness that only a few of the great mass of Alpine travellers can enjoy. The question, "What is the use of going up there?" has never been better answered than by Tschudi: "It is the feeling of spiritual power that glows in him, and drives him to overcome the dead horrors of nature; it is the charm of measuring the power peculiar to man, the infinite capacity of an intelligent will, against the rough opposition of dust; it is the holy impulse to seek out, in the service of the

everlasting science of the earth's life and framework, for the mysterious connection of all creation; it is perhaps the longing of the lord of the earth to place the seal on his consciousness of a relationship to the infinite, by a bold, free deed, on the last conquered height, looking round on the world lying at his feet."



ALPINE ROAD.

CHAP. XXV.

MOUNTAIN PASSES AND ALPINE ROADS.

THE boundary between the German and Latine elements runs along the highest ridge of the central Alpine chain. They would have existed in sharp separation on the opposite slopes, unaffected by their neighbouring peculiarities, for thousands of years, had not the two populations and their ways of life met in the deepest recesses of the hills. It was a natural need of the first inhabitants who settled in the Alpine valleys, to find other ways from their secluded solitude, than merely that which followed the course of the streams down to the plains. They pressed in on both sides, following up the course of the water to its sources; and here the two elements met. That these encounters belong to the earliest period in which the Alpine land rises from the pre-historic darkness, appears from the present universal name "pass;" it was the *passus* which the Romans made over the Alps, in their victorious expeditions. When their mastery of the world began to extend northwards, the Roman consul, Julius Cassus, crossed them when acting against the Cimbri and Teutons; and, after his defeat, Marius with the Roman legions crossed Mont Cenis, or Mont Genevre; Julius Cæsar penetrated by the Mons Penninus (or Great St. Bernard) to meet the Salassi; and after the foundation of the colony Præ-

toria Augusta, shortly before the birth of Christ, this became a much frequented path in the time of Julius Cæsar. The luxury, discord, and crimes of the Romans produced the fall of their empire, and now the northern hordes whom they had previously oppressed, Suevi and Vandals, Burgundians and Alemanns, poured over these passes into Italy. The desolate, inaccessible mountain-paths served up to that time only for works of strife, conquest, and destruction. As the emigrations of tribes, which had hitherto shattered and transformed everything, passed away, the moral and ennobling blessings of Christianity found admission to the Alps, and here we meet the messenger of the faith, Columban and his disciples, on the lonely heights of the Lukmanier. This pass now became the most frequented by Frankish and Carolingian princes; Pepin's army crossed it to help Pope Stephen III.; Charlemagne fetched his imperial crown by this road; and the teachers whom this great ruler brought from the south, to spread civilisation, arts, and sciences amongst his people, may have crossed the rocky ridge of the Lukmanier. By its side the Splügen, the old road of the Lombards, was one of the most celebrated military passes of the middle ages: it was already a well-known pass for Romans in the time of the Emperor Antoninus.

With the increase of intercourse between the north and south of Europe, with the beginning of the trans-alpine trade, with the arrival of the pompous expeditions to Rome, undertaken by German kings to be invested by the Pope with the German empire, and crowned "Kaiser," with their battles in Italy, the Alpine passes of the Brenner, Bernhardin, Septimer, and Julier came into use. The last was the chief commercial road between Venice and France or Germany in the fifteenth century.

The value and significance of Alpine passes rose from century to century. There are few great military roads in all Europe which are so historical and sublime as these wild mountain ways. The greatest commanders of almost all centuries have striven for their possession, and on the loneliest heights, even in the midst of eternal snow, we find ruins of old fieldworks and fortifications, as on the Gargellen-joch, in the Rhætikon and the Theodul trench on the Matter-joch, 11,000 feet high. We need not recall Baldiron's troops in the Thirty Years' War, Suwarov's fearful actions on the St. Gothard, and his retreat by the Prague and Panitzer passes, Napoleon's passage by the Great St. Bernard to the battle of Marengo, and Andreas Hofer's defence of the Tyrol, to prove the political and strategical importance of Alpine passes. Neither the constructive, beneficent, and improving phases of peaceful development, nor the mighty pulsations of trade that binds and civilises the peoples, occasioned the building of the first artificial road over the Simplon. "*Le canon quand pourra-t-il passer les Alpes?*" was Napoleon's repeated and pressing question to the reporting engineer-officer. The aim of the great conqueror was to be able to send cannon, columns, and military provisions quickly and easily across the Alps. But this bold work, the execution of which must have previously seemed a mad fancy, gave the impulse to other equally grand roads, of which there are now more than a dozen across the Alps.

The conception of an "Alpine pass" is very relative. There are some which the practised pedestrian can pass very easily, and without the least danger, which scarcely cause any exertion; and, on the other hand, there are some, leading across glaciers and fields of ice, which require no less pluck and freedom from giddiness than the

ascent of considerable mountains. They may approximately be divided into those which form artificial carriage roads, in which there is active life in summer and winter, and across which run daily diligences and post waggons; bridlepaths, which can be used in favourable seasons, and can be used by means of sleighs even in winter, and finally, mere footpaths or glacier passes.

The artificial roads are masterpieces of art, triumphs of human understanding and iron endurance; their builders, Napoleon I., the Emperor Francis I. of Austria, King Victor Emmanuel of Sicily, and the Swiss cantons, Grisons, Tessin, and Uri, have erected memorials by them which exceed the pyramids and temples of the ancients. There were indeed paved roads before our century, as over the Septimer; but they were built in such difficult places, and with such little regard to making the way easy, that it was considered a tolerably rash undertaking to pass them with carriages. Consul Bonaparte was, as already stated, the first bold adventurer who had the road built across the Simplon, between the years 1801 and 1806. The passes over the St. Gothard, Splügen, and Bernhardin, had for a long time been of commercial importance. All merchandise had been for centuries carried into and out of Italy on mules and packhorses over these three passes, which often took up the whole narrow mountain path in long processions. Grisons recognised the incalculable value of practicable carriage roads, and undertook the construction of the Bernhardin at its own cost, in the years 1819 to 1823. Austria was thus compelled to follow the example, and built the Splügen; and when the cantons, especially Uri, perceived that the passengers and baggage which had formerly crossed the St. Gothard went more over the eastern passes, this road was also built at last from 1828 to 1830.

All mountain-roads follow the courses of tolerably important rivers: the St. Gothard the Reuss and Ticino; the Bernhardin the Hinterrhein and the Möesa; the Stelvio, the Adda and Adige; the Brenner, the valley of the Eisack, &c. The inclination is at first generally slight, the direction tolerably direct. The deeper the roads penetrate into the mountains, the more rapid becomes the course of the mountain streams that meet them, the more their inclination and direction vary. Narrow rocky gorges soon make complicated erections necessary. Bridges of lofty span, penetrated gates of rock, winding zigzags begin, and the ascent increases to 6 or 7 in the 100. As the whole configuration of the Alps shows a more extended level and a less steep inclination towards the north than the south, the difficulties generally accumulate chiefly on the southern side.

The road here winds up into the gorge in numerous snakelike windings (*tourniquets*, *giravolte*), sometimes blasted in the rock, sometimes propped upon walls. The "Kehren," or "Rämk," as the driver calls the curves by which the road rises from one story to a higher one, and which are generally built up, look from below like bastions of a fortress erected one above another. This arrangement is most strikingly shown in the steep Val Tremola, on the southern slope of the St. Gothard. On the ascent from Airolo it seems as if one would never reach the end of the windings, for when the one that seemed highest has been climbed, new projections of wall with protecting stones built into them rise again and again, from the barren treeless slope, covered with black fragments of mica-schist; and the hospice is only reached after forty-six such windings. The Splügen is also rich in such zigzags both on the north and on the south towards the Isola, as are the Bernhardin near the village Hinterrhein, and

the Stelvio, on the ascent from Trafoi, in sight of the Madatsch glacier and the mighty mass of the Ortler.

At times a deep lateral valley, cutting across the main direction of the road, forces it to go round and enormously increases its length. This appears especially in the Ganther Gorge, on the Simplon. There, after the second milestone from Brieg, the road has to go a good league eastwards to gain the point of passage of the Ganther bridge. The sixth house of refuge is visible at a distance of scarcely three-quarters of a league in a direct line high up over a deep gorge, and it takes three and a half hours upon a broad level road to reach it.

In the wildest places, where the snowstorms rage most furiously, in order to afford an asylum to the traveller in winter, stone houses of refuge are erected at measured intervals, which are partly inhabited by the pioneers (Rutner or cantonniers) appointed to keep up the road — a kind of Siberian banishment. During the mildest winter months, the man who seeks for help in the uninhabited houses of refuge finds split wood enough to light a fire in the chimney, and a loaf and bundle of hay, in case he and his horse should be compelled by an avalanche or deep drifts of snow to stay here longer than a day. On the Simplon, in addition to the great Hospice, the old Hospice, the villages of Berisal, Simpelen and Gsteig, there are nine houses of refuge in nine leagues, of which, the fifth and sixth, as also the eighth and ninth, are scarcely a quarter of an hour apart.

The galleries are of greater importance for the safety of the road in winter and spring. They are either tunnels driven through the rocks, as the third gallery on the Stelvio in the Vallone della Neve, the galleries of Gondo and Alaby on the southern slope of the Simplon, or artificially built vaulted passages, with openings like port-

holes, as in the Schöllenen gorge near Brüggwald on the St. Gothard, and on many other mountain roads, which are intended to secure man, beast, and burden, in notorious places, exposed to regularly recurring ground avalanches, against being buried in snow. They are so firmly constructed that avalanches cannot injure those who are staying in the gallery by their fearful blows, and thunder over them to hurry down to the valley. It has certainly often happened, that unusual broad surfaces of snow have given way and choked each end of the gallery. In this case, the pioneers generally soon come to help, breaking through the barricades of snow, and freeing the persons immured.

There are galleries, however, which have to be erected as a protection against water, because mountain streams shoot down over the road in full, broad cascades, and would render the passage impossible. Such a one is the Kaltwasser gallery on the Simplon. Here the Kaltwasser glacier hangs threateningly over the road from a neighbouring peak, and during the warm season discharges a vigorous brook of milky-looking water, which roars in a moving arch over the middle of the eleven gallery windows. The traveller stands behind the cascade, in the gallery vaulted with stalactites, and sees through the hurrying sheaf of rays. But, in addition to this, the galleries are also a protection against the colossal icicles formed by the trickling and freezing snow water, which detach themselves in the spring from the overhanging masses of rock, and crash down with fearful vehemence.

The longest of all the galleries is that called All' Acque Rose, 1530 feet long, on the Splügen, which receives its name from the trickling chalybeate waters, which have coloured the rocks red. It is certainly trifling as compared with the modern works, such as the Hauenstein

tunnel, 8310 Swiss feet in length, but was long considered a marvel of Alpine architecture. Crosses on the road mark the places where travellers have perished in avalanches and snowstorms.

A big, lofty, wooden cross, painted red, generally marks the height of the pass, as a sign of victory that the ascent is finished, and a warning to thank God for his protection. The hospices or mountain inns generally lie a little to the south below the water-shed, in order to be in some degree protected from the storms which rage from both sides. This is the case on the Simplon, Gothard, and Splügen.

The old manyfold romance of the road, which railways have completely destroyed in the plain, still rules over these cultivated Alpine passages. The far-sounding, discordant ring of the six heavy, robust coach-horses before the high-vaulted, broad-wheeled carriage, with its white roof, still sounds, and the rough postilion still cracks his variations on the whip, and accompanies them at times with his choicest selection of oaths. Dust steams up in long-drawn clouds. An Italian cattle-driver is taking his herd of young, black, and dark-brown milch cows, and a number of "mäis stiere" (beasts for fattening), to the Lugano market. The lad goes on with his mountain stick and the usual umbrella under his arm (for no Tessiner or Appenzeller ever travels without this means of protection), on his shoulders the milking-stool, and he raises his loud, high-pitched cry, sinking with a gradually falling tone — "Ooo—ohohohohoho, komm wädli, wädli, wädli," with which he encourages his beasts to step out stoutly (wädli = weidlich). In the midst of the crowd of beasts, rather driving than haranguing, and working very demonstratively on the backs of his immediate neighbours with blows from a cudgel, goes an interpreter, a ruined cattle-

dealer, who has lost goods and chattels by unfortunate speculations. He has full command of the Italian patois, since he has held dealings and driven cattle in Lombardy for the last quarter of a century. Now, as his last beast has been put up to auction at home, he is serving his neighbour as broker and bargainer for daily pay and a proportion of the earnings. The real adventurer of the Alpine caravan brings up the rear of the whole long-extended train. The chief part of his fortune is in this wandering capital. Now, it depends upon luck whether the demand is lively and good prices to be had, or whether the market is over-stocked with good cattle, and the demand flat. If the speculation takes, he may earn a thousand francs at once. But he may lose as much, if he has to lower his price; for, to drive his fifty cattle home again, twelve days' journey over different mountains, and without sufficient food, would cost him dearer still. He steps on, meditating deeply on his luck. Suddenly, the rolling of the carriage, a loud cry, the confusion of his herd, startles him from his meditations. The diligence comes quickly down the pass: the postilion, conscious of his dignity on his lofty seat, to whom, as the servant of the state, even a herd of cattle must give way, drives sharply amongst the horned troop. Raging and cursing, cudgelling and coaxing of the drivers, cracking of whips and laughter of the coachman, the screams of the nervous lady in the *coupé*, who is afraid for her personal safety, cows lowing in every tone, and the hoarse barking of dogs, mingle and rise into a tragic scene in the thick clouds of dust. A few cows turn and start homewards, but "Schnauz," the vigilant, trustworthy dog, who only thinks of the duty imposed upon him of the most strict and unconditional "forwards," and takes no notice of impediments, puts his police arrangements into action

with inexorable zeal ; he has to struggle with "B'platzed" (a cow so called from a great white spot or "platz" on her forehead), who wishes to establish her rights with her horns, whilst "s'Möhrli," a gentle, intelligent cow, goes steadily on her way. She is therefore thought worthy of wearing her master's cloak rolled up round her neck. The cattle-drivers abuse the postilion and guard, who is lying on the covering of the carriage to give up his proper place to an Englishman ; the post people reply with equal vigour. The horses become restive in the tumult ; one jumps over the traces, the confusion increases, the diligence has to stop. A general row, scandal, and confusion of tongues — "Briccone ! Dundershagel ! Mal-detto villano ! Scempiotto ! Strahls-chogg !" is screamed and growled from all sides.

"A delightful complication !" "En avant la voiture !" "Jar kene Ordnung nich !" rises from the diligence. At length the conflict ceases. The herd goes on down-hill ; the carriage rolls with redoubled speed to the valley. The many sharp corners do not hinder the skilful driver on his lofty box from keeping up the pace. He shoots, in the twinkling of an eye, past his comrade, who is creeping up-hill on foot by his horses, and can only get his heavy burden slowly upwards. He is greeted by a bit of chaff, which he repays next day on the inverse meeting. Unheard and unseen, above them all, a message from the Italian peninsula flies along the iron wires of the electric telegraph which accompanies every Alpine road, "Garibaldi has taken Palermo."

How different are the winter forms of life on the road ! By the middle of October the first burdens of snow sprinkled by the clouds are laying the foundation of the future sleigh-road along the height of the pass. If the autumn is clear and sunny, and a prevailing warm

southern wind blowing, these foundation layers are partly melted by the day's heat. But small sporadic remains always hold out on the shady side, and are preserved by the night frosts. As often as it rains in the valley it snows on the heights. These shy attempts, though frequently repulsed, are repeated till one day the whole country is covered far down with snow, and winter has fully begun. The mountain is now impassable for wheels; the sleigh service begins both for the post and for baggage. It is nothing very remarkable over the French passes of Mont Cenis (6800 ft.), Col de Lautaret (6890 ft.), and Mont Genève (6140 ft.). The travellers are packed in large six-seated post-sleighs, with a team of from ten to twelve horses. White horses have been used for a long period, because "*Cavallo bianco mai stanco*"—white horses never tire. Wooden shutters have to be provided instead of glass windows, through whose cracks and holes the storm whistles, and smuggles the fine, dust-like snow into the darkness within. It is different on the passes of the Valais and Grisons, across which the postal service is now taken with the Swiss baggage to Colico Piano, on the Lake of Como, from the Splügen; and Arona, on the Lago Maggiore, from the Simplon. The journey is made in large, comfortable carriages as far as the road is "*aber*," *i. e.* free from snow. Dots of snow on each side announce the approach of the snowy region. When the even, smooth, white sleigh-road appears, the passenger sees a number of sledges with one or two seats, which are lying turned over by the roadside, out of cover, left unwatched and unattended to.

Scenes now occur which remind one of an arctic expedition. The postilion treads a manger in the snow with his feet, puts hay into it for the horses to bait and

be ready for new exertions. The conductor chooses the fittest carriages for his freight; and the loading of goods, letter-bags, boxes, and passengers begins. Each of the last has a thick buffalo cloak given to him. It is a praiseworthy act of humanity for the Confederacy to provide such sufficient means of sustaining warmth. When it is dry and cold, cheerful, unrestrained liveliness generally prevails amongst the travellers. Painters would find subjects for *genre* pictures, full of humour — companions to the rendezvous under the Wettertanne. But when there is strong wind and snow, if the atmosphere is full of ominous grey clouds, and the storm is howling through the rocky clefts, then certainly there are scenes of sufficient discomfort. The huge, firm diligence is now well closed, and left standing with as little care as the sleighs by the way-side, until the post, coming over the pass, leaves its sleighs on this side, and undertakes the transport of the passengers in the opposite direction. There were formerly sleighs for the transport of women, in which they were packed up like babes in swaddling clothes. These consist of long, coffin-like boxes, with clean bedding, so that a person might lie down at full length, with a four-fold woollen covering, and be covered, besides, up to the upper part of the body, with a firmly-fixed leather apron. It was a complete protection against wind and cold. It is obvious that the passengers had to change their position at the top of the pass, so that their heads might be higher than their feet.

Each sleigh has one horse. The postilion sits in the first, the guard in the last, to oversee the whole train. All the horses go without being driven. If heavy snow has fallen, a sledge drawn by oxen is sent in front, accompanied by half a dozen men, pioneers, armed with shovels, to help if needful. The transport of gentlemen's

carriages at this season is very troublesome and costly. They have to be taken to pieces, and packed upon several sleighs; and that which carries the coach-box is in need of special precautions and of an uninterrupted fastening with ropes, to preserve its equilibrium. Where smaller burdens go easily and safely across narrow places, a sleigh laden with a coach-box runs in no small danger of falling into the depths, if the men with it do not lend a hand quickly and skilfully. For the higher one climbs the mountain, the more uneven becomes the accumulation of the snow. Particular places seem to have been swept, from the thinness with which the glittering winter crystals are scattered on the road, whilst elsewhere there are gigantic drifts. The further in the winter or spring, the greater of course becomes the accumulation of snow. It frequently happens that though the path leads over snow from six to ten feet deep, it still lies between bastions of snow as high as stockades, or in places where the snow has been so accumulated that one would have to climb up really steep hills if the pioneers had not broken tunnels and galleries through them.

The most dangerous places in the spring are those which lead near precipices. The drifted snow gradually makes overhanging projections, which run out like rafters from the proper foundation of the road, or rise up freely like buttresses. A driver or postilion not well acquainted with the pass may easily be misled by the entire alteration in the form of the road, to choose the apparently more convenient path along the edge, not suspecting that he has literally no ground under his feet, and is travelling with his burden hanging over an abyss. A trifling circumstance may cause such a mass of snow, which has

been holding firm through the winter, as though built up with cement, to give way and bury man and horse.

This, together with numerous avalanches, is one of the causes which have given such ominous names to the steep, narrow gorges built up in snakelike windings, such as the Val Tremola (Tremble Valley), built on the St. Gothard, and the Passo della Morte, above Isola, on the Splügen.

The road is only opened wide enough for sleighs in the deep winter snow ; lofty snow-walls rise on each side. Hence stations for sidings are necessary, where the overpass caravan may wait in a sheltered place when it observes a train below, till they have crossed each other. In the parts of the road which ascend by zigzags the postilion often gives his horse a sharp cut with his whip, and leaves the train for a quarter of an hour to ascend by a shorter trodden path. The travellers generally drive their horses on with snowballs when they get tired. There are seasons when the road is so filled by snow-drifts for long distances that the post has to remain stuck fast in the pass, and may congratulate itself on reaching the hospice or mountain inn. Here it often waits a whole day till the roads are again practicable. At Christmas 1859 four guards had to wait for four days at the St. Gothard hospice for the opening of the Val Tremola.

It is the business of the pioneers, "cantonniers," to keep the roads open and passable. In the plains the forester and woodman, the peasant and road-maker, and such people, are supposed to be thoroughly hardened against wind and weather. It is a question whether they could display that toughness of nature, that almost invincible last and iron strength without which the cantonnier is inconceivable. It lies in the bone and marrow of the mountaineer, in his india-rubber sinews

and muscles, in the harder organisation of his body, stunted, as it seems, by the effect of the cold, that he reaches old age in good health, whilst pursuing every year his difficult and dangerous craft. The cantonniers are paid by the local governments (on the St. Gothard by the Swiss Federation, which pays yearly fifty or sixty thousand francs to keep this pass alone open). In earlier times, before there were well-arranged regulations for the road, communication would often be stopped for a fortnight by heavy snowfalls: such an interruption never extends at the present time for more than one or two days.

The work is generally divided into two halves. The first is the so-called "Fürleite." It has to force the first actual breach after heavy snow. The "Fürleiter" goes with a dozen strong draught oxen before the sleigh into the waste depths of snow. One beast is harnessed before another, because two abreast easily get into a mess with their harness. The best and most lasting horses are tired far sooner than a team of oxen. A faint path is traced by these attacks begun simultaneously on both sides of the mountain. The accompanying pioneers follow the sleigh and partly shovel out the first tracks. A second company of workmen is of a less radical nature; it has the conservative task of widening the trench which has been opened and keeping it in a practicable state. These are the "Weger" or Rutner, with the "Hauptweger" at their head. Dangerous as are both branches of the work, few men lose their lives by it. They know the lie of the country as well as their own rooms. They carefully watch every change of wind and weather, and observe its consequences; they know almost instinctively how to avoid avalanches. Postilions, coachmen, packmen, all who are on the road, pay attention to the warnings and advice of the

cantonniers, and when they have been neglected from levity or conceit, evil consequences have generally resulted.

When the post has once reached the top of the pass, and passengers and horses have been refreshed, the train rushes down with the speed of lightning with loud cries of exultation through the icy breeze. At times the whole train cuts off the zigzags, where the snow is not too deep or a diagonal line (*contrapendenza*) has been broken through. After various troubles, the traveller reaches the valley, and greets the first houses with joyful enthusiasm. In comparison with the many accidents that occur in the plains from upset carriages and restive horses, wonderfully few calamities of this kind occur in the Alps. To diminish, however, as much as possible, the effects of those which do happen, covered sleighs provided with windows are never used on the Swiss roads, for fear the passengers should be injured by the broken panes of glass. For the same reason the French and Sardinian mountain sleighs have wooden lattices instead of glass. Such is life upon the carriage roads.

It is very different on much frequented passes not practicable for carriages. There the fluctuating life appears still in the primeval simplicity of home-growth, both in the construction of the roads and in all the arrangements with regard to it. Where nature has not sufficiently opened a passage, and where swamps and yielding ground make the path insecure, the Alpine peasant sank unhewn masses of rock, and made a Cyclopean pavement, which here and there reminds one of the fragments of old Roman roads. Here the mountain traveller finds no galleries to protect him against avalanches, and no houses of refuge to secure him against snow-storms. At the utmost the valleys whose

intercourse is carried on over the pass have erected (as on the Fluela pass in the Grisons) a wretched wooden hut, where a little hay may be provided for the horses, or rough huts of stone, like the Daubenkehr on the Gemmi. For the rest, it looks like death between the starting points, and skeletons of horses, lining the way, tell of numerous accidents which occur on these wastes during winter. For most passes are dreary in landscape, and tire the traveller by their monotony. The passes rise for several hours along broad, uniform mountain gullies, shut in on both sides by uninteresting forms of rock, and watered by a mountain brook and perhaps beautiful waterfalls, with a broken stony pathway, and show on their heights no view, either to a distance or into the valley, to repay one's toil, but lead down into the opposite valley by a way corresponding to the ascent. This is especially the case in many of the passes through the outlying mountains of Switzerland and the Tyrol. The Prigel, between Glarus and Schwyz, is a model of this dulness, which is followed however by many of the other passes in the Proper Alps, as the Septimer, the Albula and Fluela, the Pfietscher Joch, &c.

The passes of central and western Switzerland are far more energetic, more interesting and rich in forms, revealing beautiful views with startling suddenness. To these belong especially those which are to some extent provided with means of protection, on account of their being greatly frequented. The best example is the Great St. Bernard, between the Valais and Savoy, with its celebrated hospice. It is no less a point for the visits of summer tourists than a help to travel for many thousands of travellers yearly. The Grimsel may be put by its side for importance. The most important cheese trade from Canton Berne to Italy is carried over this pass. It is one of

the most frequented Alpine passes, for which reason the valley of Hasli has founded and endowed a strong stone building as hospice near the top of the pass. Every poor traveller here, as on the St. Gothard, Simplon, and Great St. Bernard, is allowed to pass the night, and taken care of free of expense. The third high Alpine pass, provided with such a hospice, and not practicable for carriages, is the Lukmanier, in the Grisons, the neighbourhood of which is a model of dreary landscape.

On many high Alpine passes which are used for daily communication, "Berghäuser," or "Taurenhäuser," as they are called in the Tyrol, are built and kept by peasants, where, as in other inns, food and lodging is to be had for payment. The Schwarzenbach house, on the Gemmi, has become known in Germany from Werner's tragi-comedy, "The Twenty-fourth of February." The murder there described is mere fiction. The Gemmi and Grimsel, like all the other passes leading from the Valais to the Canton Berne, present sublime, although somewhat restricted, views over noble groups in the high Alps from their summits. As the southern slopes of the Alps, as already observed, is steeper than that towards the north, the descent of the passes on this side are generally steeper and rougher. A good levelled path leads from the Grimsel over the steep Mayenwand to the Rhone glacier, and a similar one has been blasted on the Gemmi, from the lofty Balmwand, rising almost vertically to a height of near 2000 feet. It is one of the strangest paths to be found anywhere in the Alps. A deep, dismal rocky cleft splits the wall from top to bottom. By artificial building or blasting a winding rock passage, rising as it were in stories, has been formed, which seldom shows more than a dozen paces to the traveller. A loud echo, like that in the empty halls of a large church, accompanies every spoken word. The

traveller ascending from the baths of Leuk can hear the cries of those descending more than half an hour off, without seeing them till he is close upon them. Meanwhile the view downwards over the parapet is more than awful, and for an hour and a half, at every turn of the road, Leuk seems to lie vertically under his feet. The packman and his packhorses are still sometimes met as a rarity in this pass.

Since the building of the great roads, this method of transporting baggage over the Alps on the backs of horses and mules, which had been in use for centuries during the whole middle ages till quite modern times, has all but disappeared. It is only to be met with at times on passes much frequented and yet not practicable for carriages like the Gemmi. Every mule carries a saddle constructed of wooden staves, which reaches far out on each side, and covers the whole back from the neck to the haunches. The rolls of baggage, which are obliged to have a tolerably even shape, are laid upon the saddle, divided so that the whole weight, of not more than three hundredweight, hangs in equilibrium. The beasts are obliged to wear basket-muzzles, in order to prevent one animal throwing the whole train of beasts behind him into confusion by stopping to pick up grass. Every beast is also provided with a bell, in order that the caravans meeting on the old paths, which were so narrow, especially in the winter, might pass without difficulty at the appointed siding. A great waterproof covering was spread over the whole burden, generally painted brown and marked with the name of the packman. As the laden wares stand up some way on each side of the packsaddles, each horse requires a tolerably broad space of road, and this compels them not to go in the centre of the path, where they might easily strike against the projecting or overhanging corners of rock,

but along the side of the way, often close to precipices. A trifle, a single careless step, may send the beast a crushing fall over awful depths. These cavalcades, one packhorse behind the other, announcing themselves from far by a harmonious tinkle, were formerly a considerable ornament to Alpine landscapes. Each packman had from six to seven horses, and such a section was called a "Staab Rosse" (a staff of horses).

The adventurers in these organised Alpine caravans were divided, according to the district which their trains of transport were to cross, into "Strackfuhrleute" or "Adrittura" packmen, and "Roodfuhrleute." The first crossed the mountain without delivering their goods from Italian markets (Chiavenna, Bellinzona, Meran, Aosta, &c.) to the depôts on this side of the Alps; the others only went to the head of the pass, where the custom-houses (Mauthhäuser, Susten, or Dogana) stood, and were there unladen. There the "Ennetbirgish" packmen or those from the Italian side transferred their goods to the "dissentbirgischen Roodern." They generally met up there at mid-day, and a rapid exchange went on for a few hours, and loud, busy life reigned in the dead wastes.

This kind of transport has, as we have said, entirely disappeared since the practicable carriage roads were made. The custom-houses on the heights and the lines within the Swiss territory have been turned to other uses since a common chain of customs has surrounded the whole Swiss frontier. Only single names, as Dazio grande (great toll) in the Zweiner Thal on the St. Gothard, bring the old state of things to mind. Neither tolls nor road or bridge money exists within the whole of Switzerland since the new arrangements of 1848.

The packhorse, as well as the mountain horse so much

used at the present day, the last of which is used for tourists in summer, and in many places for carrying the utensils and milk up to the Alpine pastures, is small, compressed, tough-boned, and muscular, but of by no means handsome or well-proportioned shape. His legs are short, his hoofs round, the fetlocks long, which gives greater elasticity to his paces ; his breast is very broad, the hair on his mane and feet generally very rough. Although in liveliness of temperament, grace of motion, and nobility of bearing, it is unmistakeably inferior to the riding or carriage horse of the plains, it not only does not yield to it in faithfulness, good will, and intelligence, and generally in solid practical qualities, but even exceeds it in all that concerns foresight and wonderfully perfect instinct. It goes wonderfully safely ; it thoughtfully picks its way along the rough stony road, and a packhorse very seldom stumbles or falls. If left to its free choice, it finds the way that suits it, without ill-timed leading or driving, and avoids the outside edge leading down to the precipice where it is to be feared.

The now extinct class of packmen were a rough, brutal class of men, utterly unpolished by civilised life ; every second word in their mouths was an oath or bad name. Their dangerous and laborious calling, and constant strife with the elements, produced stiff hardihood and contempt of death in them. Most of them had had hands or feet frozen, or been in some way maimed by the time an immoderate use of spirituous liquors producing inflammatory attacks had laid them in their graves, or an avalanche had carried them off. It is calculated that on the roads of the Grisons, in earlier times, three or four packmen were killed yearly.

Very different from the passes hitherto described are those solitary, rough, and strange footpaths, which often

lead for hours over glaciers and snowfields, which are scarcely ever trod but by smugglers, poachers, and custom-house officers, or by shepherds, messengers, and porters in the summer. But here again there are many shadings and subdivisions. The trodden line which should make the path recognisable by the eye is generally invisible: through forest gullies, on the brink of dark gorges, over Alpine meadows and furrowed slopes of *débris*, the path winds upwards to be found by the memory of the traveller, or by special bearings, till it reaches the splintered rocky labyrinth, in whose deepest hollow lies the point of passage. Here there is not, as on the common passes, a high level basin between the broad ridges of the mountain range, with its tarn lying in almost everlasting rest. A sharp-pointed ridge, only a few feet broad, generally separates one side from the other, offering beautiful views backwards and forwards, as on the Juchli, between the Engelberg and Melchthal, in Unterwalden, on the Gocht, in the Churfirsten, between Quinten on the Wallensee, and in Alt St. Johann in Toggenburg. Passes of this kind generally appear in the torn and splintered limestone Alps.

The ridges which rise above the snow line are still wilder and more startling, such as the Segnes or Flimser pass (between Glarus and the Grisons), where a narrow, dark-grey ridge of limestone rises from the beds of snow. Here is the celebrated Martinsloch, a natural rock window of considerable breadth in the Tschingelwand, through which, in March and September, the sun shines for three days on the village of Elm. The snow-storms rage on this pass with diabolical fury, and many travellers have fallen victims to it. Others, who have lost their way, and thought that it led through the Martinsloch, have fallen over the cliff and had to be picked up, severely hurt, by

the peasants of the Alp. Still worse is its western neighbour, the Kisten pass, 9000 feet high, leading from Linththal to Brigels. There the road leads to the rocky walls of the Ruchi and the so-called "Hohes Loch," and from thence over narrow terraces of turf and rock to the Mutt Alp. The "Hohes Loch" passes through a reddish limestone cliff, and affords such a narrow passage that only one person can creep through after another. On putting one's head through the hole, the awful depths of the Limmthal become visible right under the rocky window. Only bold chamois hunters and determined, firm-headed mountaineers, dare to take the road, because one has, in addition, to wade the brook flowing in the dismal Limmern gorge, and at one place, the Rothstein, to jump down into the water from a rocky cliff, when the brook, as frequently happens, has washed away the pine trunk, which the chamois hunters leave to climb over.

There are many higher glacier passes which are far less dangerous, such is the Langtaufergoch, the Oetzthaler-ferner, and the Hochthor under the Gross Glockner, the Monte Moro (8970 feet), the Col d'Oren over the Arolla glacier in the Val d'Hérins, into the Piedmontese Val Pellina, and most remarkably the Matterjoch on St. Theodule, below the Matterhorn, from the Zermatt valley into Val Tournanche, which, although it leads over glaciers for four hours, is not only passed by women, but, in October and November, when the crevasses are crossed by bearing snow bridges, is even used for mules and cattle.

Finally, the worst passes, for which indeed the word "pass" will scarcely serve in its ordinary acceptation, are those ways over icy deserts only to be attacked by hearty men of iron strength and free from giddiness, and which are subject to the same conditions and accidents as ex-

peditions to the tops of the high Alps. There are some which have great fame in the world of tourists, and are often crossed under the direction of proved and celebrated guides.

Amongst these are the fourteen hours' march over the Strahleck, a ridge of ice between the Schreckhorn and Finsteraarhorn in the Bernese Oberland, the direct route from Grindelwald to the Grimsel, in which the whole length of the Lower Grindelwald, Finsteraar, and Unteraar glaciers have to be crossed ; again the passage over the Col du Géant, which leads from Chamouni, over the whole length of Glacier des Bois on Mer de Glace, and the Glacier du Tacul, between the Aiguilles du Dru, du Moine and du Géant on the east, and the Aiguilles de Charmoz, Blaitière, and Mont Blanc du Tacul in the west, and leads down by the Glacier d'Entrèves to Courmayeur in sixteen hours, more than half the way being over glaciers. On the 15th of August, 1860, three English travellers were lost in the descent to Courmayeur. They were going along a ridge, with a precipice to right and left, the last one stumbled from fatigue, slid down the snow, and drew after him the guide and his two comrades. The two other guides who held *the ends of the rope*, did their best to save the four unfortunates, but in vain ; they had to leave their hold for fear of being themselves carried away. Those who fell slipped five kilomètres down the slope, and their fall started an avalanche which rolled after them, and overtook and buried them. Next day, people found the four bodies beneath a mass of rock. They were buried at Courmayeur on the 17th of August, in presence of all the strangers there at the time.

To this category, again, belong the paths from Zermatt across the Saasgrat over the Findelen glacier, between

the Strahlhorn and Adler to the Mattmark See—the noble pass from Evolena in the Val d'Hérins, over the Ferpécé glacier, by the Tête Blanche, and down the Zmutt glacier to Zermatt—then the way from the Riffelhorn, over the Weissthor, with its fearfully rapid descent down to Macugnaga in the Val d'Anzasca. The way from the Riffel Inn to the top of the Weissthor, although it leads over the Görner glacier and a huge snowfield, is still not dangerous nor very difficult. Only at the top, where an indescribably beautiful view opens east and south, a snowy ridge has to be passed with great care, because the deep crater of Macugnaga sinks steeply from it. A false step, a single stumble, would cause an irremediable fall down the cliffs. On this awful wall of rock, furrowed by numerous channels, between which little sharp-pointed ridges project, the traveller has to descend by crumbling rocks. The foot has no safe step, the hand no firm hold, the decaying stone is incessantly breaking off. The path, too, is so steep that the man below strikes his head against the foot of the traveller above. In clear weather it is difficult to find one's way out of this chaos, and woe to him who is surprised by clouds gathering on the Monte Rosa, or snow-storms; he is hopelessly lost if the hand of Providence does not save him. The strange Col de Trift, however, surpasses all others in high mountain scenery; it has been only made passable a few years, and leads from the Einfischthal to Zermatt. The passage is so hard, that besides other difficulties an almost vertical wall has to be climbed step by step like scaling ladders against a fortress, and an equally vertical wall of rocks to be crossed by an iron chain fixed into it, and hanging loose over the cliffs.

People complain of bad roads in the plains, when the

ground is weakened by falls of rain, or a new road freshly covered with stones, or a forest path interrupted by roots. What are such annoyances to the ordinary frequented passes, and these again to those which we have described in the last paragraph?

CHAP. XXVI.

THE HOSPICES.

THERE is plenty of theoretical Christianity taught in the world, and there is plenty of ostentatious preaching about love of our neighbours, and words of mercy, the divinity of which is developed for patient mankind with such a mass of profound learning and caustic penetration, that there is no other branch of knowledge which has cost so much paper, printer's ink, and men's blood, as just this doctrine of the highest and noblest possessions and tasks of the human race ; but in free, unselfish practice, the great lesson of the Sermon on the Mount, "Love thy neighbour as thyself," is only carried out in solitary and peculiar instances. The hospices on the Alps certainly belong to these very discontinuous manifestations of practical Christianity. *Hospitium* signifies in Latin both the place and the hospitality. Although in such cases the significations of words are only fair pretences for less honourable realities, we here unexpectedly come upon a very modest description of great tasks of noble lives. Here there is not merely a resort for hungry and tired people : the very elastic conception of hospitality includes not merely a work done without respect to persons, races, or creeds, but the unselfish endeavour to be useful to men in trouble—to help where there is need, to save where there is danger, to do the work of the Samaritan (without calculating upon expected

gratitude), that is the real aim of their task ; and it is daily performed honourably and modestly, quietly and noiselessly, without a pharisaical outcry. They who devote themselves to this work of humanity do not hypocritically cry out to the world, "I and my house will serve the Lord," but they do what they promise.

Our hospices are thus not splendid outwardly, nor from the possession of estates, for they possess in general none at all, or only under great restrictions ; they are not painted falsehoods, neither is their practice of works of mercy enveloped in a pious nimbus, nor adorned by saponaceous phrases and hypocritical sleekness. The dwellers in the hospice greet their visitors straightforwardly and roughly, as is the nature of the mountaineer. Old Zymbach at the Grimsel, before he allowed himself to be seduced into a stupid trick, of which we shall presently have to speak, was the model of a sensible, sharp, practical Alpine peasant, upright and unassuming ; his praises may be read, put forward from a full heart in Agassiz' geological travels. The Director Lombardi, aged 70, on the St. Gothard, and his intelligent son-in-law, are people as fresh and free as the mountain air that blows round them. And in the hospices presided over by monks, as the St. Bernard and Simplon, there is a hearty, lively tone, and an unconstrained sociality which appears at first hard to be reconciled with the previous conception of a convent.

And then the buildings themselves—those simple, firm, thick-walled, stone houses—they stand without external ornament, without a coquettish look, grown grey and of primeval appearance, often looking more like ancient ruins than places intended for general public receptions. Form and character correspond completely to the wild, rough mountain country, which speaks of its rough, stormy winter of nine months. The Simplon hospice

alone, which was begun by the world-swaying emperor of the French, Napoleon I., who laid down all his plans on a grand scale, but afterwards was acquired and finished by the Bernardines, stretches across the pass like an Alpine castle, palace-like, four storied and many windowed.

All the hospices, of which there are about fifteen in the Alps, are pious foundations, of greater or less extent, intended to shelter every traveller according to his means, free of expense, to give a meal gratis to the poor, or if the wildness of the weather should compel the wanderer to wait longer, to keep him for a time, and to guide people who have lost their way during snow-storms by ringing bells or sending out dogs. All the Alpine passes do not enjoy this great blessing. Only those over the Col de Lautaret (Mont Genève), Mont Cenis, the Great and Little St. Bernard, Simplon and Gothard, the Grimsel, San Giacomo in the Tessin, and that over the Lukmanier, are provided with hospices. The others have, at the outside, mountain inns, in which hospitality has to be paid for. Their height is generally only a few thousand feet below the perpetual snow. On the St. Gothard the fall of snow generally begins in the middle of October, and lasts through two-thirds of May. It thus lasts a good seven months. There is no day, however, in the calendar on which it has not snowed in some year or other. It is often so bitterly cold in July and August, at this height of 6834 feet above the sea, that flowers are frostbitten at the windows as in winter, and have to be warmed every day. The Lago Grande near the hospice is generally frozen at the beginning of July, and in winter there are nights whose bitter cold may be compared with that of Spitzbergen and Nova Zembla. Thick clouds envelope the house more than half the days in a year,

whilst perhaps sunlight is smiling in the valleys, or on the higher mountains. For the passes are also the roads by which the giants of watery vapour stride over the Alps from the warm, damp valleys of the south, and hang over the neighbouring pillars of rock as mantles of cloud and caps of mist, until either the south wind drives them over, converting them into perfect urns of rain, or the north wind repulses them. The hospice on the Col de Lautaret is remarkably similar. On the Great St. Bernard (7884 feet) the number of winter months increases to nine, in consequence of its greater height, and the clear sunny days of the year are quickly told over. All fuel has to be fetched from a distance of several hours.

Taking all these circumstances into account, it requires unusual resignation to become an "ospitalière." For the mere wish to take a place to be occupied as a benefice can scarcely be strong enough for such an act of self-denial. It is no sinecure, no hospital manager's place, like that of a great sick or poor house in a town; heavy duties (often without sufficient means) and severe deprivations burden it. To understand these circumstances a little more accurately, we must classify the hospices.

In the first place there are the four great monasteries on the Great and Little St. Bernard, the Mont Cenis and Simplon. They are inhabited and maintained by Augustine monks, and the foundation of the first three dates far back in the middle ages. The hospice on Mont Cenis is said to have been founded by Charlemagne, was considerably increased by Napoleon I. in 1801, and served as an asylum to Pius VII. in 1812. The foundation of the monastery on the Great St. Bernard by St. Bernard of Menthon (sprung from a noble family in Savoy), followed in 962, although the annals of the bishops of Lausanne commemorate a still earlier one standing in 862, whose

foundation is also ascribed to Charlemagne. Archives and documents were completely destroyed by fires which have twice visited the building. The present large building dates from the 16th century, is inhabited by twelve Augustine monks and a number of serving brothers, and is sufficient for the reception of from seventy to eighty guests. The Simplon hospice is the property of the St. Bernard monastery, is connected with it, and provided by it with from four to six ecclesiastics, under the authority of a superior. The hospice on the Little St. Bernard is perhaps the oldest of all, although here too there are no written records. It is far more scantily provided than the above-mentioned, and is supplied partially by the commune of Aosta, and inhabited by brothers delegated from the Great St. Bernard. According to tradition, Hannibal is said to have rested on this height and held a council of war, on which account a space surrounded by large red blocks of stone on the plain at the top of the pass is called the Cirque d'Annibal. The young monks who shut themselves up to serve in these monasteries generally begin in their twentieth year, and undertake the duty of remaining here fifteen years. Many of them give way in that time from the severity of the climate, and the hardships or dangers to life when they make the excursions with their dogs in winter or spring, after avalanches or severe falls of snow, with the view of helping travellers in difficulty. The few endurable summer months, during which travellers for pleasure arrive, are the only time of recreation for the monks. During this time, however, they thoroughly enjoy life, devote themselves to the entertainment of their visitors, make excursions with ladies to beautiful points of view, play on the piano, and by their refined and gentlemanlike behaviour, win the favour of all their guests to a high degree.

Sciences do not appear to trouble their heads particularly, and if here or there one busies himself with some kind of experiment, the results are tolerably unimportant.

The friendliness of their greeting, and attention to treating strangers, if too many of them have not taken up their quarters there, is really great. Immediately on their entrance, one of the serving-brothers meets the stranger as at a good hotel, and leads him, according to his rank, either to the refectory or to a great room behind the kitchen, intended for the poorer classes. Here the guest is regaled with something to eat, if it is not time for meals. Strangers of the higher classes dine with the monks at the same table, and have a really rich and abundant series of dishes, considering the height, with a delicate wine. The poorer passengers, who claim an absolutely gratuitous entertainment, are strengthened for their continued journey by soup, meat, bread, and a small glass of brandy; and at evening led to a clean, warm, and comfortable sleeping-room. On the great St. Bernard female guests are received in a small special building next to the regular hospice, called the Hôtel de St.-Louis. According to the rules of the order, ladies are also excluded from the table at the great meal-times, six in the morning and evening, which, however, does not prevent the monks from devoting a great part of their unoccupied time to the ladies, with French gallantry; for French is the universal medium of conversation at all these four monastic hospices. The property of the two other affiliated hospices, the Little St. Bernard and Simplon, is perhaps considerable. At the same time, the sacrifices which they make to the community are very great. The yearly number of passengers over the Simplon varies between ten and twelve thousand; that over the Great St. Bernard, from sixteen to twenty thou-

sand ; so that the budget of expenses in the last-named hospice reaches 100,000 francs.

The St. Gothard hospice is far from being so favourably situated, with regard to its economic means or locality. Its foundation probably falls at the beginning of the 14th century. From 1682 to 1841, it was occupied by two Capuchin monks (with some interruptions from wars, fire, and destruction), since which time it has passed into the hands of its very zealous director, the well-known old Lombardi, who does not belong to any religious order. He lives up there summer and winter ; and it is his duty to see that the road is properly attended to, even in bad weather ; and has, therefore, through the bad half of the year, either in person or by the people he employs, to inspect the road, and set to work the men set apart for clearing off the snow. In order that he may thoroughly carry out search and assistance for people in difficulties, he is compelled, on the side belonging to Canton Tessin, always to keep a strong male servant, and a maid to attend upon female travellers, as well as one horse at least, by which means he can transport strangers who are unable to continue their journey on foot to the houses of shelter at Airolo or Urseren. It is also his task to take care of strangers so long as they are unable to continue their journey, whenever necessary.

In the government license it is said, "*Tutti gli uomini sono fratelli ed eguali, tutti hanno diritto ai medesimi servizi, ai medesimi benefici*" (all men are brothers and equals ; all have a right to the same services and benefits). That is a sentiment honourable to the Canton Tessin and its statesmen. But the hospice is poor, entirely without means ; it possesses no funds, and has to draw its sources of support, amounting to 10,000 francs yearly, from benevolent voluntary contributions. These

come in so sparingly, however, that almost every year concludes with a deficit. It is then a very difficult problem to be benevolent without having the means for it in one's hands. The number of poor travellers taken care of yearly amounts to between ten and twelve thousand, and is unmistakeably on the increase, without an increase in the funds. Rich people, who have reached the limits of their earthly lives, might well deposit their goods here by will, do a hundred-fold greater service to suffering humanity, and gain more heartfelt blessings than by many other donations to funds which have, without their help, accumulated many considerable estates. For it is certainly an elevating consciousness that, by a drop of wine or a bit of bread, one may have been of service to the poor who are fainting in the terrible rocky wilds, or whose lives are threatened by the unchained wrath of the elements. May this cursory remark find some echo in the hearts of humane people !

The government of Canton Tessin, within which the house lies, occasionally presents them with old clothes that have become unserviceable for the army, for distribution amongst the poor. The method by which here, as in the great monastic hospices, help is given to travellers half frozen by great cold or sudden and unexpected storms of weather is highly to the purpose. They are first led about in a cold room, and have given to them either mulled wine or a kind of weak grog. The parts of their bodies which have been most exposed to the cold are then dipped in snow water, rubbed with snow, and, as the circulation of the blood becomes more lively, laid in a warm room, well covered with woollen cloths, and supplied with the necessary food. This is generally followed by a lethargic sleep, which sometimes lasts for twenty hours. On waking the patients are generally so

restored that, after a meal, they are able to continue their journey. The feeling of intense relief, and the happy comfort which embraces the traveller who enters in wild weather, and finds such a humane and hearty reception, is not to be described; and the stranger who has any means, without being asked for it, willingly contributes the worth of that which has been unselfishly given to him. There are certainly travellers of higher rank who are mean enough to go on without giving anything.

In all these hospices those celebrated dogs are kept who go out with the servants in bad weather, and help them to find out people who are lost, or have had accidents, by their wonderfully developed instinct. By their powerful build and unusual hardiness they are able to hold out against the most vehement storms. An accurately characteristic description of them is to be found in Tschudi's "*Thierleben der Alpenwelt*." On the St. Gothard there are now kept one St. Bernard's dog, one Kamschatka, and two Leonberger dogs (presented by Herr Esseg of Stuttgart), which are said to be very serviceable.

The number of real accidents has much diminished of late years. On the Great St. Bernard no fatal case has occurred for some time. It is worse on the St. Gothard, on account of the necessary regular postal service. Besides the accident related on page 188 of this book, it happened a few weeks earlier that on the so-called Plangen, above the refuge "*Am Mätteli*," thirteen men who accompanied the post, together with horses and sleighs, were carried down into the Reuss by an overpowering avalanche. Three of them, fathers of families, and nine horses, found their graves in the snow; the others were saved by speedy help. A truly tragical case, however, overtook one of the most zealous helpers, Herr

Joseph Müller of Hasperthal, during these attempts. He had gone to stand by his neighbours, but was overwhelmed by a new avalanche at the place called "Im Harnisch," and lost his life. On the 27th of October, in the same year, the post coming from Airolo was overwhelmed by an avalanche near the house of refuge, Ponte Tremola; a traveller from Bergamo was killed, the others were saved. The latest accidents took place on the 2nd of November, 1855, on which day three men were carried over an abyss by the fall of a "snow-shield," but were saved by united and vigorous efforts.

The well-known Grimsel hospice is of very different character in greatness and importance. It now has far more the splendour of an inn opened for speculation, in which all that tickles the palate is to be had for money, than the character of an unselfish, benevolent institution. The circumstance that it was let by the Oberhasli valley to the present landlord, shows its different position. Besides, the landlord formerly had the right to ask every passenger a toll for keeping up the road, and leave was promised to him to keep an inn for money. When the lessee was obliged to give poor travellers a night's lodging and a simple meal, he had, on the other hand, the right to make collections throughout all Switzerland, and to recover payments for his intended benefits. If we add that the pass of the Grimsel is one by no means so universally used for trade and intercourse as that over the St. Gothard, that in consequence only the poor of the immediately neighbouring districts profited by it, it follows that the Grimsel is nothing more nor less than a regular inn, and by no means a hospice in the proper sense. Besides this, the landlord does not pass the winter with his family at this hospice, 700 feet lower than that on the St. Gothard, but leaves it with his cattle

in November, and does not return till the beginning of March. During the most severe quarter of the year, only one servant, or at most two, remain in the Grimsel, in order to keep the road close to the house in order, to send out dogs in heavy snow-storms, and when the dogs bark, to show the direction by loud cries. This winter stay may almost be compared to Siberian banishment, as in severe and snowy winters, weeks or even months pass without any one crossing the road, whilst all intercourse with the neighbouring villages is cut off. The nearest human dwelling is the Valaisan village, Oberwald, two and a half hours off. Remembering that in deep snow a walk often becomes three or fourfold the time on hard, dry ground, and considering that the snowfall in this neighbourhood often reaches such a height that the servant has to get out of the upper windows of the house to clear the path to the door, and finally, that avalanches frequently threaten to destroy the huge, firm, casemate-like building, it will be granted that the lot of a winter servant on the Grimsel is more dull and disheartening than that of a villain shut up in a cell.

Formerly the landlord was allowed to go about collecting in the country, or to send men about for this purpose. As it followed, however, that much deception was practised under this pretext; as, moreover, experience showed that the landlord was carrying on an excellent business in his remote, uncontrolled district by the extraordinary increase of visitors and by sufficient bills, the good will of benevolent contributors sank, and in most cantons he was forbidden to collect, in compensation for which the government made him a present from their cantonal poor fund. Besides this, the whole number of poor people yearly relieved here amounts only to between 900 and 1600 persons.

A celebrated criminal case contributed a good deal to clear up the nature of the Grimsel hospice.

Since the year 1836, Peter Zybach of Meyringen had been lessee of the Grimsel, with the meadows and rights of collecting for a yearly payment of 2500 francs, and managed it to every one's content. He himself had the best reason to be content with his lease, as it was established, that during the summer he took from rich tourists yearly some 140,000 francs. The lease came to an end with the year 1852, and as Zybach had become well to do at the Grimsel, there were other aspirants for the term of a new lease. Besides this, a report was current that the Grimsel would be put up to open auction, and in such an auction it might be driven up to a high price. Zybach proposed to the Land Commission a new four years' lease, at a considerably increased rent, without, however, gaining the consent of the court. Suddenly an account came from the wilderness of the Grimsel to the Haslithal, that the hospice had been burnt down in a few hours on the night of the fifth of November. According to the report of three servants, a stranger had come in in the evening and lodged in the middle story. At half-past eleven at night the servants had been awakened by the barking of the dogs, and when they went out into the passage, a clear flame was shining. The fire had obviously been kindled by the imprudence of the guest, and he had been burnt. The fire had so soon gained the upper hand that all attempts to extinguish it were in vain. The furniture, insured for 20,000 francs, was burnt. In spite of the deep snow, a commission of investigation went up to the Grimsel, and it soon appeared that almost all the goods and chattels had been concealed and thus saved. Zybach hesitated in his answers, then wished to give up his claims for indemnification, but was foolish enough to make proposals of

bribery to the commissioner, if he would be silent, and when he remained honourably firm to his duty, the unfortunate criminal threw himself into the lake behind the hospice, to escape by suicide from the shame of a severe punishment. Zymbach, however, was saved, and thrown into prison with his servants. Here an investigation showed that, by Zymbach's persuasion, and on a promise of 750 francs, the servants had declared themselves ready, and after putting the effects in safety had set fire to the building.

Zymbach, who was, independently of this, not very popular with the people of the valley, because he had rapidly turned into a prosperous man, and one making show of his prosperity, was not only at once condemned through the whole Haslithal, but the wrath of the people found new food for irreconcilable hatred because the destruction of the hospice made it impossible for the people to pass the Grimsel in the spring, the time of the most active cheese trade with Italy. For it is four and a half hours from Guttanen, the last village of the Haslithal, and several hours more from there to the Valais, by a very difficult, and in winter very dangerous road. A good resting place was thus an absolute necessity, and the hospice had in fact been founded with this object.

The state prosecution had to propose the punishment of death for Zymbach, and the judgment of the court of the Bernese Oberland was death, and twelve years' imprisonment for the accomplices. The appeal brought by Zymbach before the great Court of the Canton, changed the sentence of death to imprisonment for life, because Zymbach had during his whole life been an honourable man and an excellent father of a family; and when the unfortunate man had been imprisoned for some years, and the physicians had declared that a change of residence

was necessary to save his life, the rest of his punishment was remitted on a petition from his family conditionally on his emigrating to America. He now lives unknown, and under another name in Germany — where, no one knows. The Grimsel has been increased, and built anew with more convenience, and is a yearly rendezvous of the tourist world.

Such are the great, celebrated, world-known Alpine hospices. There are a few more of them, which are not known or celebrated, little visited, and still less thought of by the liberality of benevolent people, leading a quiet, solitary life. They are those small houses of refuge on the old Alpine pass of the Lukmanier, which are kept by poor peasants. In the depths of the Val Blegno, behind Olivone, the path creeps up to the top of the pass, and here, at a few hours' distance, lie the two little houses at Casaccia and Camperio. They were founded by St. Carlo Borromeo out of the property of the orders of humiliation which he abolished, as opposed to his reformatory tendencies, but which have now grown so poor that they do not deserve the name less than they fulfil the duty. Still more effete and robbed of all means of support are the three on the Grisons side of the mountain. Santa Maria, the miserable and dirty St. Galls, and further on St. John without means of life or any kind of endowment. The formerly rich convent of Dissentis used originally to take care of and support them; but since the monks have not much left for themselves, and the State has been obliged to act to a certain extent as their guardian on account of their disorderly housekeeping, these beneficial institutions are gradually falling into more complete ruin. A little better situated are the Ospizio in Valle, and that All'Acqua (near the waterfall of St. Charles), in the Bedretto valley.

On all other mountain roads, however rough and

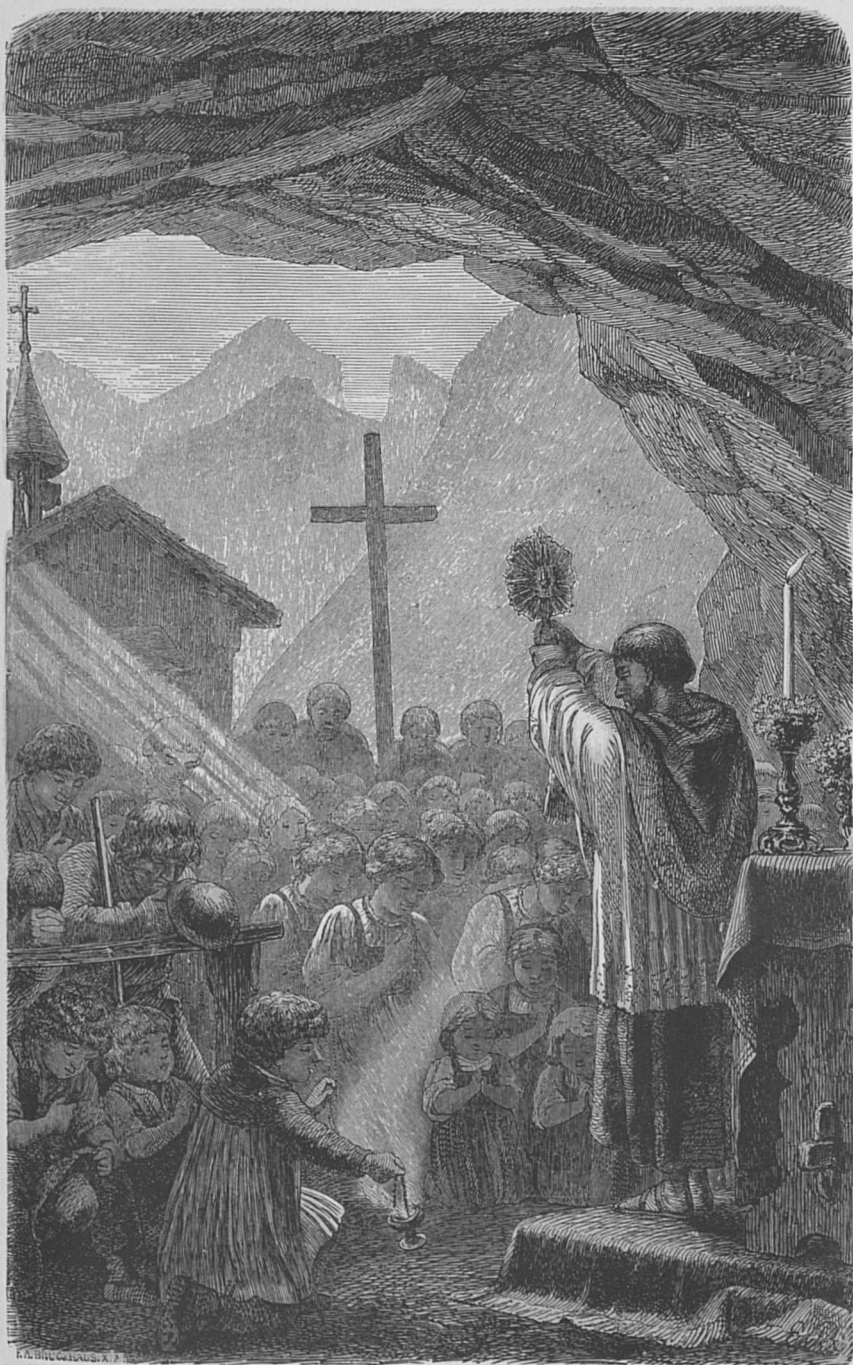
dangerous they may be, there exists no such excellent institutions of a humane benevolence. At the utmost a mountain inn may have been established by speculation when the pass is frequented, and service may be had for money. For the rest, every poor devil is freely permitted, on any of these passes, to starve and to freeze at his pleasure.

CHAP. XXVII.

CHALET LIFE IN THE ALPS.

THE patriarchal husbandry of the Alps comes down to our century strange and legendary, almost like a romantic reminiscence of bygone times. When we have seen the farmers and economists of the plains take a lively share in modern progress, in discoveries over the domains of chemistry, mechanics, and physics, which affect him — when he brings the treasures of his barns and his stalls to market by the railway, lives at the best hotels, wears town-clothes, builds town-houses, adopts town-manners, and begins to destroy our conception of the good, old, original, round, firm “peasant” — many will find it hard to understand that, close to railways and the thronging life of towns, there is still a peasant world which, in a certain sense, stands upon the second historical stage of a people’s development, and like the Tartars leaves house and home, wife and children, to pass a nomade life during part of the year, in order to travel with their wealth of herds a day’s journey into the mountains, where fresh young pasturage is to be had for the cattle. The meadows scattered high up in the Alps, with strong, short, thick, herbage, very favourable to the production of milk, form an important part of the national wealth, and yearly produce a value of many million francs.

But, just because the Alpine life in the chalets is some-



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thing unusual and strange, he who has never visited the Alps easily confuses the romance of the neighbouring landscape, the sublime impressions of the mountains, as he has met them in pictures, and a poetical ideal of customs, habits, and ways of life of the people, with the real life in chalets, and invents ornamental pictures which have no actual existence.

Alpine husbandry is something quite different from what people sometimes fancy. It exists only late in the spring, in summer, and in the first autumn months. During the winter the peasant keeps his beasts in stalls in the Alps, just as in other places. He who goes up with the cattle into the mountains during the good season is a "Senn." In Switzerland this is done by men; in the Eastern Alps, in the Bavarian highlands, and in Austria, generally by women, the "Sennerin," "Almerin."

A Senn ("Sejniun" in Romansch) is, with few exceptions, a very prosaic mountain peasant. His cattle are his chief possession, and therefore the source of his life's occupation, the object of his study, meditation, and greatest care, his pride, and, in short, they form his great problem in life. He takes rank amongst his companions in his commune according to the greatness of his herd; he is valued according to it, ascribes to it his respect at home, his magnateship in the village. Thus it is in most Alpine valleys. There are also, however, rich peasants in Alpine villages, who do not trouble themselves about breeding cattle and Alpine husbandry, and their Alps are let out for rent.

Every peasant who possesses cattle does not go to the Alps; the size of his herd determines it. He who has twenty-four or more cows is called a "Sennten-bauer," because this number, especially when a bull is added to it, is called a "Senntum." He who has fewer is called in Appenzell only a "Schüppeli Vech." Such greater possessors of

cattle, called "Alpadore" in the Italian Alps, have either pasturages of their own, or pay rent for some, or (what is generally the case) make use of the common Alps or "Hirteren." Smaller peasants, who have only a few cows, go themselves in spring to the Vor Alps — "Berg-güter," or "Maiersässe," also to the common Alps; but when the cattle are driven up to the higher pasturages in July and August (the so-called middle and upper "Staffel," in Italian "Stabei" or "Corti"), a number of neighbours intrust their cows to a common Senn, with whom they settle accounts at the conclusion of the Alpine season, generally at Michaelmas. To be able to arrange the amounts of cheese and butter business due to each individual, as different cows do not give the same amount of milk, all the persons who share go up on two appointed days during the Alpine season (called in the Engadine "in Süras"), each cow is milked in presence of the sharers, the milk measured, and according to this result the proportion of the share of each to the whole is determined. The Senn who looks after the milk undertakes the duties of every day with his helps, and receives a fixed pay or a share in the profits.

To keep the Alpine pasturages in good order, and to keep general order, notwithstanding the greatest freedom, on the mountains, to which all must be subject, all the companions in the Alps choose an Alp-master, a kind of mountain police, "who is to keep the Alp honourably, protect and guard it as his own goods, make paths and look after them, and take care that no one mows wild hay till St. James's Day, to oblige the companions in the Alp to clean and stone the Alp on a certain day," and much more of the same kind. So the "Alpbüchli" prescribes a naïve code of laws passed by the peasants themselves in the Alp assembly, which has to be read over once a year

and confirmed, or altered if required, according to the decision of the majority.

The winter passes monotonously and quietly. The Alpine villages are snowed up; the communication between one and another is often cut off, and, when the houses are widely scattered, even the communication from one house to another. The only inducement which leads the peasants up to the mountains is either sliding down wood or wild hay. In many Alpine districts it often happens that when the Senn has exhausted the provision of fodder in one hay stable, he goes to another perhaps an hour off with his herd, then to a third or fourth, and thus leads a wandering life, even in winter, till the Alpine season begins. At last spring returns to the land of the Alps.

It is the end of May; the long-expected day of the journey to the Alp arrives—the feast of resurrection in the calendar of the Senn. A few days before he had already been there with his man, had repaired the way where perhaps it had been destroyed by an avalanche, had looked to the roof, and made the most necessary preparations for the entry of the guests. Now the Senn, and all who are going with him to the mountain, adorn themselves. The sister fixes nosegays of flowers with gold tinsel, or wreaths of young leaves and box, on the hat of her brother, the “maitele” (maiden) on that of her “buob” (lad); varied ribands flutter and twinkle; the dazzling white linen rolled up high over the brown arms contrasts well with the scarlet cloth waistcoat and the bright yellow leather gaiters of the Appenzeller and Toggenburger, or where there is still a national costume, and where the levelling tendencies of our time, penetrating even into the mountain valleys, have not wiped out every trace of the ancient independent growth of the people’s

doing and thinking, dress and manners. For there are great Alpine valleys in which all spirit, the whole poetical side of the people, has disappeared, and only the most home-brewed, neat, and prosaic daily life rules. The cows are stroked and sleeked till their coats shine in the golden sunshine, and not a drop of water would stick to their smooth coats. With corybantine shouts of exultation, betokening an inexhaustible humour, the "Zusenn" opens the procession, if only men are going to the Alp, with his white or painted milkpail on his shoulder. The largest, handsomest cows follow him with their brazen "trychlen" (bells), a foot high, hanging from their broad leathern neckbands provided with all kinds of coloured ornaments sewed to them. These bells, of which there are generally three to each train, bulge out to a considerable breadth near the handle, often to a foot in diameter, but grow narrower below, and cause such a fearful alarumlike and yet not inharmonious sound, that it can be heard an hour away in favourable weather. These gigantic bells are put on the cows only whilst the procession is passing the villages, to give splendour to the herd and entice all the people. If this object is gained, this instrument of display is taken away from their necks, because experience shows that it is prejudicial to the cows' lungs.

A concourse of people takes place in the villages through which the procession passes, for old and young wish to pass in review "Korde-Urche-Bübli's" (Conrad Ulrich's) or Franz-Anthony-Lismet-Seppeli's beautiful cows, and examine their shape and "g'schlachtheit" (breed) with the air of connoisseurs. The mountain peasant has his cows' æsthetics, which distinguishes the finest shades of colour, position of feet and horns, and other peculiarities with close discrimination. Jumping and springing as

if they knew that they were going up to the rich nourishing Alpine pastures, the whole herd of cows, goats, and lambs follows in long procession. Roaring and grumbling, in the midst goes the Sultan of the Seraglio, the "Muni," to-day the scapegoat for universal amusement; for it has been the popular custom from of old to bind the milking stool, adorned with flowers, between his horns. The "gaumer" or herd, and the "handbub," go with the procession in linen shirts and rough cloth hose, supporting the "Zusem" with cries and "jodels." The packhorse with the cheese implements brings up the rear, with the possessor of the herd unmistakably conscious of the triumph that is being celebrated.

Women and children generally stay behind in the valleys. But there are places in the Grisons (such as Davos and Mitten), as also in the Valais, which migrate altogether into the summer village, leaving their winter abode with the houses shut up; perhaps one old man left behind as a watcher. Such is the journey into the Alps.

This is the picturesque, animated side of the journey, at least. But there are other expeditions of herds into the high mountains, in which not only difficult passages have to be overcome, but strength and skill to be employed, and even life to be risked. This is especially the case when the Alpine pasturage lies on the other side of a glacier, and the slippery level of ice, with its concealed rents and crevasses, has to be crossed. There is then need of special erections; by help of picks and axes, roads and bridges of boards are prepared, or ways made through labyrinths of ice, and scattered with sand and earth, in order to overcome the instinctive repugnance of the cattle to the element so strange and deceitful to them. The herd often hesitates with invincible obstinacy

to tread upon the surface of the ice, and the Senns are compelled to seize the most desperate means of compulsion. There are even Alps where one cow after another has to be let down over lofty walls of rock like bundles of merchandise from a crane.

The protective roof of the chalet ("Sennhütte") lies amidst the grassy ocean of the Alp, without ornament and simple as a rough sketch, hearty and inviting, as a greeting of welcome to the meadows, and yet with something theatrically picturesque (as the Alp Büls on the Churfirsten near the Wallensee). The whole construction, in the districts abounding in forests, is throughout that of a blockhouse; it is erected simply of wood that has turned a deep brown from the action of the sun's rays through many years. Only the substructure, a few feet in height, is of stone, often a wall that seems to have been built in times before civilisation. Above this one-storied, artless ground floor, that, from its naïve, unlaboured naturalness, harmonises with the majestic simplicity of the mountain world, rests the flat, silver-grey, rough shingle-roof. It is weighted with heavy stones, in order that the wild Föhn, the oldest countryman of the mountaineer, when he is roaring up warm from the south and plunging over the cliffs into the mountain basins, may leave the huts untouched. This is the asylum of the Senn and his helps during the summer months. In the Alps where good order reigns, and proper care is taken of the cattle, "gaden" or stalls are erected by the chalet, where the herd is placed during oppressive heats, in cold nights or wild storms. Rational management has not introduced such erections everywhere, and there are Alps enough in which the Wettertanne is the only refuge of the wretched cattle during heat and fearful storms. The born-and-bred sluggishness of the mountaineer will not suffer any

innovation to be undertaken in the Alp. The Alpine husbandry is still carried on as it was in "Pfuch-ähni's" (great-great-grandfather's) times. If at all practicable, the chalet is built against a rock, or, if it overhangs, even partly under it, in order to get a thoroughly cool place for the milk. If a fresh spring or glacier brook runs near, the dweller in the Alps likes to conduct the water through his cellar, to drive away the air which has grown sour from the milk by the ventilation produced, and to bring fresh particles of air with the water into the room. The immediate neighbourhood of the chalet is generally a bottomless swamp of mire, in which nettles and Alpine sorrel grow luxuriantly. The interior generally answers to this filthy surrounding, and is a powerful corrective for every brain heated by sublime fancies; for purity and neatness are everywhere anything but distinguishing attributes of cattle-keeping people, and the mountaineer makes no efforts to be an exception. The bright-coloured, cheerful feast-day dress, which so excited and charmed the eye on the journey up, has disappeared. White coarse linen trousers, which speak of stable-work in every shade, and a ditto "futterhemd," *i. e.* a blouse-like jacket without an opening in front, together with the heavy clamping wooden shoes, and a close fitting cap, form the whole dress of the Senn.

An entry into the interior of the chalet leads at once to the central rooms. According to the old German custom, dwelling-room and kitchen, dining-place and dressing-room, are all united in one general apartment, and here one may literally rest at the hospitable hearth. This hearth, and the milk-kettle hung above it, take up most of the room, displaying their high importance. Here is the spot where the chemical process of separation takes place which lays the first foundation of the delicate Swiss cheeses.

Hence this locality is significantly called the "Weller" (where the milk is gently simmered or "erwellet"). Below the hearth no extensive culinary apparatus need be looked for, such as one finds in old peasants' houses, with vast chimneys: such superfluities do not belong to the simplicity of the Alpine world. The Senn in the Swiss Alps manages his cooking to this day something as in our youthful recollections Robinson Crusoe did from necessity; a blackened hole in the front corner of the chalet, surrounded by a few stones, without chimney or passage for the smoke, forms the hearth. "To give a promise *behind* the hearth" would certainly not be possible here. Close by it stands an upright tree, fixed in above and below, and thus capable of being turned round with a long iron arm, the so-called "turner," to which the milk kettle is hung. The smoke may find its own way out just as it likes,—through the door or roof-shingles, or through the cracks between the beams. Hence the interior of every chalet is tolerably full of smoke. If the Alpine air is pure, fine, thin, and not much saturated with watery vapour, the smoke is soon consumed, so that the organs of breathing are not much burdened. If, however, it rains and snows, so that the air presses heavily on the roof, the otherwise draughty and cold resting-place inside the chalet becomes scarcely bearable. Other comforts for daily wants are a folding table some two feet long, which is fastened by hooks to the wall, and for the sake of room can be turned back when not used; then a chest in form of a bench along the wall, a block of wood which may act as a seat, and a shelf which has to take the place of a cupboard, where all kinds of things, bread and articles of dress, are kept. Besides this, there perhaps hangs a rifle against the wall, if the Senn is also fond of sport; and in the Catholic districts the peasant of strict

belief does not forget the basin of holy water, with the "nuster" (paternoster, or wreath of roses), which is perhaps increased by a "Heiligen Helgeli" from the monastery at Einsiedeln pasted to the wainscot. Every other piece of furniture in the house is part of the preparations for cheese and butter. The sleeping-room is very variously arranged. In the Bernese Oberland, where the chalets have along their front a kind of artless entrance-hall or peristyle, called "mulchedach," or milk-passage (because the cows are milked there in bad weather), the sleeping-place, called the "gastere," is placed in this projecting part of the building; in other districts it is over the pigstye, and called "trileten." It is easy to understand how agreeable this position is from the immediate neighbourhood of the restless grunting sleeping companions, and the exhalations which arise from them. For the rest the couch is not inferior to the rest of the house in originality of construction and simplicity. A mattress stuffed with wild hay, the undisturbed home of a legion of bloodsuckers, and a woollen coverlet, or, as in the Valais and Grisons, a cloth made of sheepskin, is the whole preparation for the sleeping apartment. If the shingle roof is out of order, an involuntary shower-bath is prepared for the travellers in steady lasting rain; or if, as before said, the flat roof of the chalet leans against an accessible block of stone, the inquisitive, never-resting goats climb round about it all night, and keep up such an awful clattering as if the fabulous unicorn was passing his monstrous existence up there. Such is life in the idyllic, romantic chalets, which appear so charming in poetical productions on the stage.

In all the moderately-sized Alps of Switzerland there are generally three men and a boy; women look after them, as we have already said, only in the Eastern and

Austrian Alps, and in some valleys of the Valais. The "Senn" is major-domo; either as himself possessor of the herd, or as appointed by a society, he is commander of the regiment, takes care of the cheese and the magazine, and is, at the same time, book-keeper of the concern. Memorandum-book, day-book, list of current prices, and ledger-books, generally are either united in a calendar of the quarter interleaved with paper, and stuck behind a flat board nailed to the wall, or some kind of small pocket-book contains the hieroglyphics of the whole management of the business. His help and supporter is the "Sennbub, handbub, schorrbub, junger," or, in the Valais, the "pató," who, like the Senn, spends the greatest part of his time in the chalets; he has to clean the vessels (which, in contrast with the ordinary habits of the chalet, are kept perfectly clean, because the goodness of the cheeses, &c., depends upon it), and to help the Senn, but is not always a lad (bub) of fourteen or fifteen, but often a tough fellow of thirty or more. The mediator between valley and mountain, the cheese mercury and telegraph to home, is the "Zusenn," who has to carry down all the productions of the Alp, and to bring back wood and victuals. In the Valaisan patois he is generally called "Lamieiy" (*l'ami*). Where things are well ordered, he has a packhorse to help him. Finally, the proper herd is the "Chüener, gaumer, Kühbub," or "Rinderer," or, in the Valais, "Vigly" (*vigilantia*?) His exclusive duty is to drive out and look after the cows.

In safe places where the cows cannot fall, and no beast of prey can attack the herd, he lies half day long on the ground in fine weather, looks out on the noble Alpine landscape, "jodels" to his heart's content down to the valley, and is happy in dreamy idleness. If, however, the cattle have to be kept on a steep Alp, he has to go by

giddy precipices, to points where the pasturing cattle does not trust itself, and death goes step for step with him. In storm or thunder, in pouring rain, and at every time of day, he has to fulfil his dangerous calling, and often has to remain all day long in wet clothes. This is the reverse of the charming picture of shepherd life. But the Senn has his part of it too, when it rains weeks together, clouds lie like evil spirits of the mountain grey and dismally round the huts, the wet wood will not burn, and wind and icy draughts whistle through the hut till the limbs are frozen, or when it is snowing in July, and piling up its flakes a foot deep, so that the cattle can find no food for days, are roaring for hunger, and give no milk. Handsome and sightly as the herd is on the Alp during good weather, they grow equally miserable and thin in cold wet summers.

The arrangement of the day in the Alps is uniform in the extreme. Sundays and weekdays alike — no bell announces the sabbath rest, no clean dress marks the feast-day, not a drop of wine at the inn wets the thirsty throat in the evening. Whilst the whole landscape is still resting a dreamy cloud-blue in the arms of the early morning, the valleys are steaming deep below in the twilight, and strips of white mist are creeping through ravines and gorges, whilst the night sends its last greetings by the morning star, and the forehead of the sky and snowy points of the ice-mountains are just blushing with the day's first kiss, the Senn rises from his hard couch of hay, and milks whilst the "handbub" is lighting the fire. The milk is directly warmed in the great kettle, and separated with "etscher" (rennet) so that it runs off into "käsbulderer" and whey. Meanwhile full day moves up on its cheerful morning pinions.

The Sennen have had breakfast, the herd drives out his

cattle, the "handbub" cleans his vessels, and the Senn continues to work at his cheeses. The household work fills up the day. As evening comes on, the tired day gradually goes to sleep, the everlasting "world's heart of flame," the sun, sinks behind the mountains, the herd or the Senn entices the cows to the chalet with the "Rug-gussler" or Ranz des Vaches, empties the foaming pails of the rich creamlike milk, and the morning's procedure, with supper and cleaning the utensils, finishes the day's work. At nightfall the Senn, in Catholic districts, goes out of the chalet, sings with a loud voice through a great wooden milk funnel (called "Valle") a prayer in the choral melody, generally verses from the Gospel of St. John, with the English greeting. The other herdsmen in the mountains and the wild hay-cutters or root-diggers who hear it, kneel down piously, and utter a Paternoster or Ave Maria. This call replaces in the solitary Alps the evening bell, which in the valleys summons people to thanksgivings for the past day, and serves at the same time as a hospitable invitation to belated and perhaps lost travellers. There are, however, hitches in the hospitality sometimes, especially in the Italian Alps. The herdsmen in remote districts often have a great objection to receive travellers for the night, for fear of entertaining robbers. They cannot believe that any one should clamber about the rocks with a view to pleasure or comfort, and suspect that only necessity and flight drive men to the mountains. In the Tyrol, they often fancy mountain travellers to be messengers of the government, sent to inquire into the condition of the people, their number of cattle and property. "Now we shall soon have a new tax," is the general chorus of the incredulous. Other Senns on Alps let out for hire, or on those belonging to a company, refuse most decidedly to give anything, or

perhaps give "um Gotteswillen," a bit of "zieger" (dry cheese) to the almost fainting traveller, but will take no money for it, in order not to be suspected of infidelity to their employers. This happens of course in districts little visited by tourists, such as the lateral valleys of the Engadine.

When all is finished in the chalet, they go to rest on the wild hay, under the "Schnetzli-Decke," and deep strong sleep strengthens the wearied limbs of these harmless children of nature.

Only one interval comes as a friendly resting-place into the monotony of Alpine existence. It is the Alpine feast-day, the "Alpstoberte," the "Aelplerkibli," or whatever it is called in the different districts. To these we shall devote a later chapter. In Catholic districts, a public morning service is connected with it. Very few Alps have chapels or places of worship in which divine service takes place through the whole summer. The largest chapel is on the most beautiful of all Alps, or the "Urner boden;" it looks like a stately church, and the assistant priest of Spiringen in the Schächenthal (Tell's native valley) reads the mass to a numerous congregation of Semns. The chapel with the monastery, "Maria zum See," on the Rigi, is of similar origin. Then far up in the Kalfeuserthal in the St. Gall Oberland, is the little chapel of St. Martin lying in the midst of numerous rock-ruins; and in the Martell Valley (Pinschgau, Tyrol) stands the lonely chapel of "Maria-Schmelz," originally built for the workmen in the extinct smelting works. At present the chaplain comes up every Sunday from the valley.

The most original temple of this kind is the "Wildkirchli" in Appenzell. A cave in the rocks, in a lofty vertical cliff (below the beautiful Ebenalp), into which, had it not been dedicated by his remote ancestors as a place for

divine worship, the goatherd would fly from thunderstorms with his flocks, presents the hall of the chapel, modest and artless, a natural vault, as it came from the hand of the creator. No marble altar, no picture from the artist's hand, adorns the consecrated shrine; a modest shelf, cut out by the mason's hand, is provided for the service; the altar is hung with a cloth, and freshly gathered Alpine roses fill the vases; the candles flicker in the draught at the back of the cave, smoking against the martyr's cross, before which the crowd kneels in the dust. The "Wildkirchli" is dedicated to St. Michael, and a Capuchin monk celebrates the service there every year on the feast of the guardian-angel. There the people kneel humbly down, smite their breasts in repentance, and murmur their prayers. Do they retire into the depths of their spirits? Do they, after their fashion, look into their hearts in moments of overwhelming emotion, and laying bare all the springs of their souls? The incense steams; mechanically, diligently, untouched by the power of the sacred moment, the ministering boy swings it; a faint sickly scent of ambergris arises,—what is it to the vast consecrated vapour of the summer morning which floats round the steep, lofty Alpine cliffs? Now the far-sounding tinkle of the bell announces far down in the depths of the Seealpseethal that the mysterious transubstantiation has taken place far up on the steep wall of rock, and the lonely Senn on the Maarwies or the rocky bastion of the Alpsiegleten, who was prevented from coming over to the feast by his work at the chalets, strikes his breast and murmurs his customary prayer. Down below in the Schwendi, the matron is sitting on the threshold before her son-in-law's house, with the rosary held between her withered trembling hands. She, too, hears the sound of the bell and prays; but her thoughts

do not dwell in the sanctuary of her hereditary faith. Her imagination certainly rises, but not to the shining space where, according to her childlike belief, the blessed are waiting beyond the clouds round the beaming throne, surrounded by troops of angels: her thoughts only rise as far as the Ebenalp. She thinks of the feast to be celebrated to-day, how joyfully it passed in all its country splendour in her maiden days. Fifty years ago she was the fairest of all the countryside. Franz-Anthoni's Mareieli must be at all the dances and evening festivities in the winter for far round; she was the ornament of every Alpine feast, and of the Urnäscher Chilbi, the most jovial meeting in all the land of Appenzell. She was the leader in the circle of singing maidens; her clear bell-like voice rose most joyously up the mountain walls, and, as if the echo had chosen Mareieli for its love, it only repeated her "Juchzger" loud and clearly accentuated, whilst the echo of the song of the rest came back confused, with Mareieli's relieved with diamond clearness against it. Ah! she had lived a pleasant harmless youth, and it was at the guardian-angel's feast that the "Senn" of her parents had asked for her as his wife. Now he is dead, twenty years ago; St. Michael had not been a guardian-angel for him, for he had slipped and been killed just under the Wildkirchli at the leaf-gathering. Now Mareieli is sitting there alone, old, infirm, and poor. The sound of the bell calls up her memories, joy and grief together, into the wearied heart.

Let us go back to the Alp. We have already mentioned the Ranz des Vaches. This now celebrated herdsman's song, which was once forbidden under penalty of death in France, because at its sound the soldiers of the Swiss regiments were seized with home-sickness, deserted in masses, and hastened to the mountains,—the real genuine

“Chüiereiha” has almost entirely disappeared; it is, at any rate, seldom to be heard. It is, as we have said, the song for bringing home the cows, which the cowherd sings at the stable door to entice the cows with its well-known note. To make them follow better, he gives them a little salt from his “Läcktäschli.” The text of the Appenzell Ranz des Vaches is as follows: — “Wönder * iha Loba? Allsamma mit nama, di alta, di junga, allsamma, Loba, Loba, Lo - - - ba. Chönd allsamma, allsamma, Loba, Loba! Wenn i-em Vech ha pfeffa, ha pfeffa, so chönd allsamma, zuha schlichha — schlichha wol zuha da zuha. Trib iha allsamma, wohl zuha, bas zuha! Höpsch sonds ond frei, holdsälig dazue. Loba, Lo - - ba! Waäs wohl, wenn ers singa vergod, wenn e Wiega idr stoba stod, wennde ma mit Füsta dre schlod, ond der Loft zue alla Löchera inablost — Lo - - ba, Loba, Loba, Lo - - - ba! Trib iha, iha alsamma, n’alsamma; die trinked, die Stinked, die B’bletzed, die Gschegget; die Gflecket, die Blisset; die Schwanzert, die Tanzert; glinzeri, blinzeri, d’Lehneri, d’Fehneri; d’Schmalzeri, d’Hasleri, d’Moseri; s’Halböhre, s’möhrli: s’E’äugli, die erst gel ond di Alt, der Grossbuch, ond die Ruch; d’Langbeneri,

* The translation of this singular patois appears to be, as nearly as I can make it out: “Will you come, cows? All together, at your names, old and young, cows! cows! When I have whistled to the cattle, come together, run hither. Come hither, better and better. You are pretty and free and innocent too. Was it well, if you forgot my singing, if the manger was put in the room, if the man struck you with his fists, and the wind sang through all the holes? Cows! cows! together! drinking and stinking, spotted and dappled, marked and pale, long tails and short, shining and blind, fat and lean, half-eared and one-eyed, young and old, vicious and tame — come hither, cows! Since I married I have had no more bread, since I married I have had no more luck, cows! If you go so well and don’t stand still, it is all right. There is nobody better than our cows; they drink of the brook, and may they thrive!”

d'Haglehneri,—trib iha wohl zuha, da zuha, bas zuha. Lo - - - ba—Sit das i g'wibet ha, ha - n - i ke Brod me k'ha, sit das i g'wibet ha, ha - n - i ke glöck me k'ha ! Loba !—Wenn's asa wohl got, ond niena stillstod, so ists go grotha,—s'iss kena Lüta bas, as osera Chücha ; sie trincket os-sem Bach, ond mogid trücha." However little poetry there may be in it, we must recognise its heartiness when the herdsman, calling over his cows by name, asks them to come in, and in the midst of his Alpine simplicity is suddenly reminded of his domestic misfortunes, but soon knows how to comfort himself.

The inhabitants of the Alps in the valley of Ormond have a similar Ranz des Vaches, with more poetical swing in it. It begins thus :—

"Les armailles dé Colombetta
Dé bon matin sé son lévâ.
Ah ! ah ! Lioba, lioba, por t' aria.
Venide toté, petité, grossé,
E bliantz é néré, d' zouven é autre,
Dézo stou tzano, yo yié ario,
Dézo stou trimblío, yo yié trinzo,
Lioba, lioba, por t'aria, etc. etc."*

The impression made upon the beasts by these Alpine songs is inextinguishable. When cows of the Alpine breed have been taken away from their native place, and afterwards accidentally hear the tune, all their recollections of the mountain pasturages seem to awake in

* "The herdsmen of Colombetta
Have risen early in the morning.
Ah ! ah ! cows, cows, to the milking.
Come all, great and small,
Black and white, young and old,
Under this oak, where I milk you,
Under this aspen, where I let the milk run.
Cows, cows, to the milking, &c. &c."

them. They break out, become quite ungovernable, run up and down, and burst through the fences. Generally cattle brought up on the mountains show a longing desire for the mountains in spring; they become restless in the meadow, uncertain in their feeding, and do not rest till their innate impulse towards the high mountains is satisfied. Corrodi says, in his Alpine letters, "The Alpine cows show intelligence; when you climb upwards over the pasturages, and the beautiful creatures lift up their heads so cleverly and inquiringly, you think you ought to show them your passport. These are not cows such as are harnessed and fastened to every kind of vehicle in the country below, that you might hang your hat on their horns; they are honourable, conscious, feeling that they are not cattle, but animals. They show race and character. Do you think a cow of the valleys would show feeling if the great bell had been round her neck and taken away again? No; but go and ask how the leading cow becomes sad, and won't eat, if deprived of her bell," &c. The leading cow is the handsomest beast of the "Senn"-dom, and because she goes farthest of all the cows, and as it were at their head, she is called the "Heer-Kuh." If a beast of this kind, which formerly enjoyed the preference of being leader of the herd, is sold to another herd, and has to submit to the rule of the other leading cow, a fight for life and death often arises. The cow on half-pay attacks the one in possession of the bell, and with such a determination and fury that the herdsmen have often great trouble in separating the fighters. As they strive for the first rank, they are often called in the "Senn" language "d'Ring-geri" (strivers or wrestlers). The bulls have just the same habits. Prudent and careful herdsmen avoid drivin two herds, each of which has a pair of them,

into adjoining pasturages ; no hedge and ditch, not even a ravine, can keep off the rival "Muni" from a duel, which generally ends in the loss of one. So it happened in the summer of 1856, that on a common meadow belonging to the commune of Tamnis (in the Vorder Rheinthal) two herds were driven to the same spot, and owing to the carelessness of the herdsmen came so near each other that two horned monarchs caught sight of each other. With a deep roar, and heads sunk for the attack, they rushed at each other, and the bull-fight began. The herdsmen who came up did not venture to come between the beasts, and the beautiful but expensive sight ended, not only by the conquered bull falling over a cliff, but by the conqueror not being able to stop his vehement charge, and falling over too.

However decided an aversion the "Senn" has to cleanliness and neatness in his Alpine economy, he is careful about the success of his manufacture, his production of milk. He devotes the greatest care and attention to it, and as the great vine cultivator and producer of wine takes the connoisseur about in his subterraneous rooms between the rows of casks, so the clever "Senn" can try experiments with his cheese-tasters. The unfortunate man whose cheeses "*vertschaaggen*," *i. e.* go wrong and are spoilt, is for years exposed to the chaff of the village, and there are some who at the present time have still to bear a nickname descended from their grandfathers. To be acknowledged as a perfect "Chäser" has even (who would believe it?) an influence on love affairs ; the maiden will not endure that her young man should not be a perfect "Senn," and many a "bröggler" (proud girl) has given up her suitor for this reason, though he had plenty of batzen. This is not surprising when one considers that, in the mountain land, which is so poor

in wheat, cheese is an important part of daily nourishment, and the whole production from milk in the Alps, including what is used at home and exported, is valued at more than a hundred million gulden yearly. For the export of the popular Swiss cheeses from Switzerland alone reaches at least eight million francs.

Neither longing for his home in the valley nor want of pasturage drives the "Senn" from one Alp down to another; there are many Alps which are not completely exhausted when the herd leaves them. The increasing coldness of the night on the heights drives him down; hence it happens in mild seasons that the "Senn" remains some weeks longer in the Alps than is otherwise customary. When the autumn has decidedly begun, and the night frosts candy leaves and stalks with their rime, the foliage loses its colour, and the forest puts on its varied clothing, the herdsmen think it time to leave the Alp. On the evening of his departure he lights a merry fire before the door of the chalet, shining far down into the lowlands,—the old beacon of the mountain folk by which they corresponded in their wars of liberation,—and with loud jodels they roll the flaming logs over the cliffs, that the sparkles may be scattered into the air. The people in the valley see and hear, and rejoice at the return of their friends.

The poetry of the herdsman's life is over for the current year, and the "Senn" goes down with the gains he has won, thinking of the pleasures of the Alpine time, and feeds on the recollection in the snowed-up winter chalets of the valley, hoping for the return of spring.

CHAP. XXVIII.

THE ALP HORN.

THE Alp horn belongs to the framework of an idyllic picture of the high mountains—an instrument which is counted so little amongst musical ones, and yet produces such great effects and peculiar tones—only, however, in its original home. The sublimity of the high mountain world, the gigantic faces of rock above narrow valleys, with their enchanting echo, and the fresh pure air, are necessary to give the proper colouring of tone which no other musical instrument possesses, and which here makes such a powerful and enchanting impression.

The exterior form of this herdsman's instrument is simple as the great lofty Alpine nature and the people that inhabit it, with its powerful tones which yet awake a tender longing for home. It represents the manufacture of instruments in its earliest childhood. An Alp horn is made of two parts: the first is formed of a young pine, 5 feet long, which grows broader at the lower end, and is generally burnt out with a hot iron, or hollowed; the lower part consists of a second piece of pinewood, which is bent and spread out like a cup, and has a length of about 18 inches. That is the whole external shape. In modern times it has been attempted to place a mouth-piece at the higher slim end, as in the great trumpets, in order to produce a quicker and more precise note, and

to employ the instrument itself more extensively. What was gained, however, in this way, was lost in another, in a much greater degree. The instrument, originally blown without a mouthpiece, lost the volume and poetry of its tone by this addition, the melting and magical ring of its natural tones; although it could not be denied that by this artificial extension a fuller, rounder sound was produced. It is about the same relation as that between the old horn without valves and the newly-invented ones; simplicity and greatness on the one side, and on the other a more florid tone, with more instrumental power, and a capacity for all harmonic applications and arrangements.

The general character of the Alp horn comes nearest that of a large trumpet, but cannot be exactly compared to any particular instrument. It possesses the metallic tone of the trumpet, and, as a wooden instrument, the softness and fulness of a good clarionet. By its length, on the other hand, it gains the power of an 8-foot organ-pipe, near the bourdon in its mean position, a mixture of metallic sound and wooden character, peculiar as the whole nature of the instrument. The compass is of about the same extent as a trumpet, in which the middle part is especially used, because these notes are more easy to produce and have also a finer tone.

The effects of the Alp horn depend upon a number of other circumstances, and even accidents. Heard from near, the Alp horn has a rough unpleasant ring, more to be compared to a hoarse groan than a sound of lament. A little way off, this roughness diminishes (which may be partly produced by the great exertion of the lungs of the performer), and the tone passes, faint, fine, and with a tender vibration, over the valleys, extending the more the further the air bears it. In a clear sky, and espe-

cially in pure air, it sounds clear, definite, and sharp, and is most like in character to the trumpet. In sultry, thundery days, or when the sky is covered, it takes a dismal melancholy character, full of longing and strange peculiar laments—that sound which calls up a painful feeling in us, awakening melancholy thoughts from which we still would not escape, for it lays an enchantment upon our soul, delights and beguiles our senses. It might be a part of the Orpheus tones that governed everything by mildness and soul-piercing tenderness. A special peculiarity of the high mountains appears in our instrument, that certain walls of rock and the valleys below them, or forest-covered slopes, have a peculiar facility in re-echoing the sound of the Alp horn. Unfortunately, physical science has not yet drawn the circle of her studies round acoustics sufficiently to be able to give laws as to the capacity of mountain-walls for echoing notes, the difference of the tone between different mountain-walls, or of the districts shut in by them, as she has done in the case of musical instruments and their acoustic effects.

The melody of the Alp horn, whilst it kept its maiden purity, and was not yet screwed up to a concert instrument, is a small simple flourish, and varies according to the humour, readiness, or fancy of the blower. It is always rhythmical, and generally severely so, even to being harsh and broken. As the Alp horn was constructed for the vast spaces of the mountains, its object is at hand and excludes every greater, more melodious tune; the echo is its object. These few notes, with a long and generally powerfully drawn concluding tone, are sufficient to produce a splendid natural concert by means of the echoes. The melody itself is so short that an appreciable pause comes between it and the echo, so that the

echo comes across to us undiluted and undisturbed by it. Alp-horn players (who are paid with a trifle for their unwearied willingness and summoning forth of the echo) generally choose such points as cause frequent repetitions of the echo. These voices of the rocks repeat each other very variously. Some are to be heard which return three or four times, swelling fuller and more boldly in a crescendo, as though the notes striking against the granite walls received some strength from their firm, hard-grained nature. Then again, in other places, the first echo rises exultingly and lively in pure peaceful volume, like a true child of the Alps, then wearies from step to step, and sounds the following repetitions in elegiac sounds, of recollections flying far, far away into the hills, like the expiring breaths of a fair soul; and again, there are some which answer at first shyly, almost with maiden modesty, then take courage, rouse themselves, and come forth loudly and decidedly, but then directly retreat in fear, mutter something confused and unintelligible, and die away almost imperceptible. Enough, the acoustic results are as varying in their quicker or slower repetition, and in the fulness and power of their tone, as the formation of the Alps and their rocky faces, and the various distance of the reflecting surfaces. A few steps right or left, above or below the assumed standing point, often completely change the effect of the echoes. If the undulations which bear the tones through the air could be seen and determined, strange new problems would be presented, for the solution of which new investigations would be necessary. But we must content ourselves with the plain obvious results which produce such enchanting effects. The rising and falling power of the notes, and the intervals of stillness between the echoes, are not the only problems which are pressed upon the listening and

thinking observer : quite different secrets as to the production of the tones are revealed. The melody is borne across to the wall, and returns, for the first time, just at the same pitch, clear, sharp, and marked, as the original. The second echo has lost a quarter of a tone, has lost its rhythmical liveliness, and sounds faint, slower, and dying away more quickly. What circumstance, what unknown aerial medium, what secret of sound changes the reproduction of the first so clear and well-marked echo ? We have observed the echo below the Faulhorn, have had it repeated certainly twenty times, and always obtained the same sinking of the tone at the second echo, an almost fainting close to the melody. The diminution of the undulations owing to the great distance can certainly only explain the sinking and gradual dying away of the tone. Another example of different character is given by the blower of the Alp horn on Alpiegen, by the Bustiglen-läger, on the ascent to the Wengern Alp from Grindelwald. There the forest seems to intercept the whole melody, and to increase it by a thousand echoes in its pine-columned halls, for the echo returns like the rolling volumes of an organ from the majestic vault of a cathedral, in mighty full waves passing into each other, like an impressive and overwhelming hymn filling the Alpine cathedral.

The sound of the Alp horn is most enjoyable when it comes upon the traveller unexpectedly. We ascended one fine morning from the valley of Lauterbrunn towards the chalets and barns on the Wengern Alp, up a steep path, through primeval pines with long tufted boughs. On our right the noble Jungfrau shone down, the lofty quiet queen of the Alps, of incomparable splendour and clearness ; from the heights and valleys rose the melodious sound of the bells of the herd. Then a long-

drawn tone struck our ears from the rock-walls of the Jungfrau. One of us called in surprise to the other, "An Alp horn;" and we all stood still, enjoying in full draught what even a symphony of Beethoven's could not produce. The herdsman began his art, and we listened breathless to the sympathetic notes that seemed to spread from the glaciers of the Jungfrau; we suspected the performer to be about half an hour off, and hastened to look for him. But how great was our astonishment when, bending round a corner of the forest, we saw the horn-blower standing on the left of the road close to us, him whom we had supposed to be far off, and whose peals now sounded harsh and rough.

The Alp horn is unluckily now seldom used, and it appears that its use is gradually becoming rarer. Even where it is still found, bunglers generally misuse it, and torture the ears of the deceived listeners, as, for example, on the Rigi. In orchestral composition we know of no introduction of the Alp horn except in Meyerbeer's "Dinorah." In Rossini's "Tell," the shalm occurs characteristically in the middle of the overture, allied in tone to the oboe, showing a side of Alpine music which is even less cultivated than the Alp horn. To what magnificent and characteristic effect Rossini would attain in the Grütli scene, if he had employed an Alp horn, which might sound down as though from the mountains through the quiet night, to introduce the great scene of the national oath! The effect would have been powerful.

It has already been attempted to tune Alp horns, so as to perform quartets or even duets with them. The attempt does not seem to have succeeded, as we have never heard anything but solos on our mountain horns. On the other hand, Alp-horn blowers have amused themselves by corresponding from distant and opposite Alps,

which produced an indescribably beautiful effect by the varying depth of the tone and the deceitful echoes. We once listened near Kandersteg to such a musical match — a war of Alp horns. The most interesting circumstance was, that the answering Alp horn stood exactly one whole interval below the one which called. This answer, returned with a completely altered character, produced a striking effect. In earlier times the use of the Alp horn was universal; as new forms of life penetrated into the quiet Alpine valleys, and the old popular usages and dress gradually disappeared, the Alp horn disappeared also. Formerly, when the Ranz des Vaches was still universal in the hills, this Alpine song was accompanied with the Alp horn, or its melody blown on the Alp horn by itself: this usage has also disappeared. Its origin dates far back. Conrad Gessner speaks of it in his book on the Pilatusberg, printed in 1555, and calls it *lituum alpinum*, and says that it is 11 feet long. In the fourteenth century it served as a signal-horn to the bold and manly inhabitants of Entlebuch and Unterwalden, to announce the approach of the enemy afar off; and now some notes are rung from it with difficulty to attract a “trinkgeld.” “Autres temps, autres mœurs.”

CHAP. XXIX.

THE GOAT-BOY.

A WHISPERING, rustling sound of bells, mixing together, now carried away and dying in the wind, growing dumb, then suddenly swelling out loudly, a strangely irregular fulness of harmony, comes down from the height. Now it sounds monotonously and hollow, but still gently modulated by the breeze, with the call of a horn at intervals, which comes and goes, now near and sharp on the ear, then again it creeps far, far away into the labyrinth of rocky gorges, a mischievous goblin which seems to be playing hide-and-seek. You stand and listen to this spirit-like sound, which fluctuates in enchanting and varying notes, and holds you fast bound,—a new wondrous charm of the Alpine world. It is the goat-boy, who is pasturing his mischievous, clambering herds on the cliffs. He has seen us, and sends a joyful “Juhu!” down to us, as his rough Alpine greeting.

The goat-boy is as much a characteristic of the Alps as the thunder of avalanches and the Alpine glow, as the chamois hunter and the shy whistling marmot. He is an ornament to the hills, an element of jovial life amongst the rocky wastes. Where no “Senn” can drive his heavy cattle because the paths disappear, and the weeds only hang like tattered rags to the stormbeaten rocks, the brown merry lad scrambles with his troop of goats, and



THE GOATBOY.

dreams himself greater, happier, and richer than knights and kings.

And yet it is generally the poorest lad of the village, often the son of a widow or a complete orphan, who has not learnt to know the pleasures of other children, and not found nourishment and protection on his parents' hearth. In order that he may earn his bread without becoming a burden to the parish, his guardians have sent him out into the mountain wilderness, where no other human foot treads. There he dwells from the early spring till the late August; mother Nature brings him up on her bosom, gives him pure air to drink, and makes him big and strong for the dangerous trade, which he works at with joy. But he loves her too, his foster-mother, and, shooting up like a wild bough, enjoys pleasures which we in the valley can hardly imagine.

The mountain peasant divides off the broad rich table which the Alp offers to his cattle, according to his pleasure and convenience, into separate classes, in order to derive the greatest profit from it. The low-lying part near human dwellings, and the highest-cultivated land, is used for the winter provision stores, for the aromatic haystacks. Further up, the slopes of gentle inclination towards the level shoulders or basins of the mountain, are dedicated to "Kuh-Alpen" ("Cow-Alps"), and each separate terrace is provided with a duly proportioned number of cows. The higher steep and stony region, where only short grass grows, is described in the "Alprodel" as "Schaf-Alp" ("Sheep-Alps"), and in the Tyrol and Grisons is generally let to the Bergamesque shepherds, in other districts used for grazing sheep. Finally, those parts which are still wilder and more splintered, where nothing but "Legföhren" and Alpine roses spread over the lower growth of weeds, or the clumps of wood which

are splendid with a richly-coloured flora, to which, however, the cattle shows but little inclination—these belong to the goat-boy and his herd.

It is a very different, fresher, and more characteristic nature which looks out from such a goat-boy, from the melancholy, wasted-out appearance of the stocking-knitting shepherd on the North German heaths, or the half-stupid, vegetative village herds in agricultural districts. Here is elasticity, firmness, race—rough and uncultivated as it may be. By daily life in the wilderness, and steady practice, these boys of from twelve to sixteen grow so confident in the use of every vantage-place for rock-climbing, that one is as much astonished at their eminent skill as natural gymnasts, as at their rare courage and the resolute quickness of eye with which they spy out the right path. Where one would think that scarcely a mouse could creep along the narrow rock-cornice, not to speak of finding room for a man's foot, the goatherd finds a way for himself and his flock. Whistling and jodelling, he creeps like a cat round the projections, for he has a need for climbing in his limbs that will not let him rest. Giddiness is a thing not to be found in his vocabulary. When Kohl, on his Alpine journey, asked a peasant on the St. Gothard whether his boy was not afraid to scramble over the rocky points, he answered, "*Non ha paura da cervello*" (he has no brain-fear); "he was brought up from his birth on goat's milk, and that gives skill and pluck in climbing." That is the same popular superstition as that of the chamois' blood, which the old writers fable to have been drunk warm by hunters to cure giddiness.

The eye gains an eagle sharpness, a power which borders upon the fabulous. Such a boy will show us chamois on a lofty point an hour off, describe their motions, and point out the smallest distinctions of form in

the shape of the ground, where the unpractised eye only sees a great dull mass. Of such boys are generally made the most daring wild-hay cutters, the most fearless and passionate chamois hunters. I have seen goat-boys who had the earnestness of a man steeled in the school of life ; under the brown weathered wildness of the face, a cool energy looked through the marble countenance, such as marked the heroes of old times. There are some such boys who, as they stand on a lump of rock in the meadows, in spite of their tattered trousers and old shapeless felt hat, have something dictatorial in their looks ; in their quiet observing looks, in the young determined gaze of the sunburnt face, in their steady unconstrained bearing, there lies the consciousness, "Here I am master." And so he is thoroughly, the autocrat of the lands he treads. Let us go up to the high Alp on the stony slopes, or into the ravine, where the goat-boy is at home. He who just now welcomed us with an electric jodel, the like of which is not to be heard far and wide through the mountains, now does not think us worth a greeting as we approach him. He looks boldly into our faces, as if he would ask "What next?" There is something like a challenge in the look with which he measures us, and yet a concealed smile is playing round the corners of his mouth. Well ! we will greet him first, and put a question to him. The sounds so strange to his ear must appear very comic to him, for his smile takes a scornful expression, as though he would say, "Ah ! you mannikins, what are you doing in my domains?" If we press him for an answer, it is very questionable if it is not tolerably evasive, if not downright rude. He thinks it, in fact, a superfluous proceeding to come up to him there in the wilds, and we must not take it ill in such lads, grown up in the solitudes, far from all intercourse with companions,

and developed by nature, if they show mistrust towards strangers. The Appenzell lads are an exception. The desire to air their opinions and humours by rough unexpected wit, which is deeply rooted in all the people, appears strongly in these boys, and it needs a good-natured and not too susceptible sympathy with their tone to move them to any confidence. Once moved, however, they are as good as gold, full of fresh original thoughts, like the first rough draft of a sketch by a genial painter. Aug. Corrodi expresses enthusiasm (in his Alpine Letters) for Hanbischli (Johann Baptist) on the Ebenalp.

Even in regard of dangers, these lads are quite masters of the situation. It is hard to form a conception of their measured courage, of their determined nervous readiness, and their quickness of decision. They have, as it were, grown up under pressure, have learnt to despise the hostile elements from their youth up, and thus nothing startles them. Woe to the robber who ventures to seize one of their herd ; he has to do with a stiff-necked, cool, and determined opponent. The boys generally take good order against the large birds of prey ; if they know of the nest of one it is all up with his brood. Everywhere in the Alps there are examples of the rarest adventures to seize nests of young birds. But they also hold their own against the old ones. We may mention a piece of bravery of modern times. Towards the end of July 1859, a boy, named Jann Guler, only fourteen years old, was on a sheep Alp belonging to the monastery of Prätigau, at a place called "im Hafen." He had several times already seen a great bird of prey circle in the air above his place of pasture, and was therefore specially on the watch. One day he suddenly saw the beasts run together in a fright, and the next second a full-grown eagle swooped down and followed a lamb which was taking refuge in

the "Legföhren." The boy, with quick determination, sprang with his ironshod stick to the bush, in which the bird was quite entangled, so that he could make no use of his wings. He made such an energetic hammering attack on the eagle that it was at last killed.

The goat-boys show no less thought, courage, perseverance, and skill, when one of their beasts has lost itself or "verjuckt," *i. e.* sprung on to a rocky ledge from which it can neither get forwards nor back ; for, wherever they are enticed by a spot of green, the goats and sheep scramble, see new strips of grass lying below them, and spring from ledge to ledge, often a fathom in depth, till they cannot get any further. Then the boy who looks after them has to release the imprisoned animal. Our illustration shows such a moment. That is the tough, unyielding, dogged nature of a genuine goat-boy. Beast and boy look as if they had been cast in one piece. The eagles are hovering above, attracted by the anxious cry of the goat, which, if the boy had not released it, they would have driven with their wings over the cliff, and have preyed upon. If they were to come now, the boy would let himself be crushed in the abyss before he would let go the goat. A charge of small shot in his back would not make the obstinate, stiff-necked lad quit his hold.

In the high mountains the sheep often remain for months left to themselves, and browse on the grassy places sticking in scattered spots to the rocks. It is then sufficient if the owner from the valley or the chalets, where he is looking after his cows, counts the herd over with a telescope. If he discovers that some of them have got into a fix, he ascends the mountain to a place from which he expects that he will be able to descend vertically to the sheep. The most determined, generally such a boy as we have described, is then let down by the rope. It then

happens sometimes that the beasts are frightened by the apparition hovering above them, perhaps mistake it for a bird of prey, and jump right over the cliffs. It may happen again that the right direction has been missed, and the boy has to climb again over many a ledge of turf, or along slippery walls of rock, to which he can only hold himself by clinging almost like a swallow. When he has actually reached the beasts, the dangerous part of the task begins. He has to catch the animal on the narrow cornice of rock, drag it after him, or to lift it above his head on the face of the giddy cliff, and so burdened, with only one hand free, to start on his return, till he reaches the rope, to which the recovered head of the flock is tied, and drawn up. The lads will thus perform this manœuvre three or four times or more, till they have succeeded. Nothing frightens them, and it is often less the actual value which they trouble themselves about, than the pig-headed carrying out of a determination once formed.

And what is the pay for all these dangers, deprivations, and trials? Let us consider the way of life of this half-savage in a civilised country more closely. The goat-herd generally starts very early in the morning from the valley, driving up a herd of milch-goats to the hills. He keeps good order amongst his horned tribes with their curiosity and prying excursions, and gets them up to the heights much more quickly than one would have thought. Before the sun is up he is already several hours away from his village. There he leaves the herd to their will and pleasure, lies down in a comfortable place, and dreams away the day in the circle of ideas presented by his goatherd's philosophy. If he is hungry he must be content with a bit of hard, dry barley bread and a bit of cheese; if he is thirsty he catches one of the best goats, lies down, and draws the foaming milk into his

mouth. When high noon is come, heating the walls of rock with its sweltering glow, he seeks a shadowy place for himself and his herd, and they all hold their siesta together. So too, when a thunderstorm breaks, he has caves or rocky hollows to take refuge in.

In a cold rainy summer, the poor barefooted lad has at the outside an old sack over his shoulders to keep off the wet. He is merry notwithstanding, and does not seem to care for the attacks of weather. In the evening he goes home, adorns his hat with Alpine flowers, and comes into the village as fresh and strong as he left it in the morning. So time passes from early spring to late autumn. And for pay he gets every year two or three batzen for each goat.

On the southern slopes of the Alps there are splendid long-haired goats. In autumn, when they give no more milk, they are driven to the forests, left to themselves without care, and caught again half wild when near lambing time in the spring. The hides are exported to Belgium, France, and England in great numbers to be turned into kid gloves. Has any of our fair readers thought, when she drew on her delicate, elastic, perfumed gloves, that the materials came from the wildest and most remote districts of the Alps, where the "Gizzi" and their boy lead a wretched, needy, but free existence?

The life of the goatherds has also its terrible, romantic side. When the owls screech in the forest at night, so that it sounds like a hellish jubilee, such as one hears at hay-time in the mountains, the people say it is "the Wild Goatherd." His story is as follows:—"A big goat-boy, who often did not know how to pass the time for dulness and mischievousness, and had already played a thousand tricks with his beasts, hit upon the

idea of crucifying a great strong he-goat, *i. e.* tying him on to a cross extemporised out of rough tree-stems with creeping plants or string, erecting him as a crucifix, and then driving his goats to him to perform service. This crime, however, was punished on the spot. A fearful storm broke out, dispersed the herd with awful thunder and lightning, and slew the boy with the crucified goat, so that the mountaineers found him next day with his face distorted and his body blackened all over. For punishment of his impious tricks he was condemned to wander at night as a 'wild goatherd.' In the forest near Aldenbach in Glarus he is heard whistling at evening, and starting from thence over the Alps." So say the people. But there are also enchanted and bewitched goats. Carrodi's Hannbischli on the Ebenalp gave the following story word for word:— "Eben* in Herbst ist en Rossma uf de Siegel ni, ebe dass er e Ross hät müsse suche. So hat er das Ross nit gfunde, s'ist niene gsi, und so ist er in e stadel ce cho ufern Siegel. Chuebode hässt. So sind siebe Mötschgässe drin gsi i dem stadel. So häss e ghungeret; so denkt er, er wöll suge, und so wie-n-en er wott suge letts ke milch ge, hets ke strich gha; do sät er, Du offat du, bisch gad e Boek! Und so händ die andere Gässe nebet

* "Just in autumn, there was a horsekeeper on the Alp, he had to look for a horse. He couldn't find the horse, he was nowhere, so he went into a stall on the Alp. It is called Chuebode. So there were seven milch-goats in the stall. So he was hungry; so he thinks he would suck (*i. e.* the milk), and when he tried there was not any milk, not a drop; so he says, 'You brute you, you're a he-goat.' And the other goats laughed at him. So he was afraid, and he said there were monsters there, and went off. And he ran half a quarter of an hour, and the goats ran after him, and all laughed at him. And he stopped in Säntis, and found the horse, and told what had happened at Chuebode, there were monsters there, it was not quite canny, he was in an awful fright, he almost ran his feet off."

ihm zueglacht. So hei's em gfürcht, und so het er gsät das seit Onghür da göng er wieder. Und so lauf er e holb Viertelstond, wit abe und d' Gässe seiid em naheglaufe, und heiid em all usglachet. Und so ist er halt in Säntis abi, und hät's Ross gfunde, und het's verzellt, wie's im Chuebode gange sei es seiid Onghür dobe, es sei nöd ganz richtig, 's hei em grusam gfürcht, er sei g'laufe dass er d' Füß fast verlore hei."

Little enviable as the lot of an Alpine goat-boy may appear, it is comfortable and sociable as compared with that of many shepherds in the Alps. We do not here intend the Bergamesque shepherds, who also live very frugally and scarcely trust themselves to taste their own cheeses, but those shepherds who live in a voluntary banishment during summer, as on the Zäsenberg below the Eiger, and elsewhere. The Zäsenberg lies in the recesses of the Grindelwald glacier, opposite the Schreckhörner, and is surrounded by ice. Here two shepherds live with one boy, several hundred sheep, and a few goats. One of their chalets is dug out under a granite rock, and the other is close to it, made out of red slabs of gneiss. The frugality of these shepherds exceeds all belief, according to Hugi's account, who visited them. Two little cups and a pan form all the household utensils belonging to one shepherd. The other, who makes little sheep's-milk cheeses, has a bit or two more, but all of primeval simplicity. The wood has to be carried more than two hours across the glacier; nevertheless they are very extravagant with their bit of artificial heat, and do not even stop up the cracks of the stones with moss or hay, to keep up the warmth. All thought, all effort at improvement, seems to cease here, and no admission is given to news of what is passing; of the merry life which prevails in the lower Alps there is here no trace. Their power of speech seems to

have been frozen ; their whole behaviour is as frosty and cold as the wild glaciers which surround them. No one comes to see them, and when it happens that they see far off tourists coming over the Strahleck, it is an event in this utter wilderness. They do not go down to the village the whole summer ; they cannot go to pass the time at any friendly Alp, as the herdsman's call can penetrate to no sympathetic human being. Thesetroglodytes have as little conversation with each other. Only a short, broken scream calls the goats to the salt prepared for them, and to milking. The sheep wander, without ever seeing the chalets, about the mountain ridges. What the herd leaves behind them when they return in the autumn to Grindelwald is browsed by the chamois. Still more dismal is the herdsman of the Oberaar Alp. In the year 1841, when Agassiz ascended the Jungfrau, a poor lad of twelve had been sent up there from the Valais, who led a stupid existence, badly clothed and badly fed. He had provisions for three months ; his bread was as hard as the granite of his wretched hut, and the cheese was drier than the hay on which the poor lad slept. All shepherds are of course not so badly off ; there are some who lead a really comfortable life. So, for example, the shepherd on the Churfirst Alps, a very friendly and talkative fellow, who has the misfortune not to possess a chalet. They tried to build him one under the Falzloch, on the pass to Toggenburg, but the artless natural walls were, as the man maintains, torn down by invisible hands, and the workmen persecuted by stones thrown at them, so that the building became impossible and had to be given up. Since then the sheep are pastured unassailed in the rocky basin of the Käserarück, and the shepherd lives in the chalets of Buls.

This is one of the reverse sides of life in the free Alps.



WILD HAY CUTTERS.

CHAP. XXX.

THE WILDHEUER.

HIGH up on the rocky summits, which, as seen from below, appear to be inaccessible to human feet, where the little round and bright green cushions of turf refresh the eye by their contrast with the smooth vertical grey cliffs, and clothe with mildness the jagged weather-beaten line of dead rough rocks, where at the utmost one would look for the eyries of the eagle and Lämmergeier, there is the harvest-place for the Wildheuer (wild-hay cutter).

When Armgart, the woman in grief, in Schiller's "William Tell," throws herself before the horse of the Landvogt Gessler on the open road and calls to him in agony,—

"Mein Mann liegt in Gefängniß,
Die armen Waisen schrei'n nach Brod — habt Mitleid,
Gestrenger Herr, mit unserm grossen Elend."

"My husband lies in prison, the poor orphans cry for bread — have compassion, stern lord, on our great misery."

—and Rudolf asks her,—

"Wer seid ihr? Wer ist euer Mann?"
"Who are you? Who is your husband?"

—she answers tremblingly,—

"Ein armer Wildheuer, guter Herr, vom Rigiberge,
Der über'm Abgrund weg das freie Gras

Abmühet von den schroffen Felsenwänden,
Wohin das Vieh sich nicht getraut zu steigen."

"A poor wild-hay man, sir, of the Rigi, who mows away the free grass over the abyss from the steep walls of rock, where the cattle do not venture to climb."

And the proud knight, knowing well what a melancholy lot is this trade, begs for the man himself.

"Bei Gott! ein elend und erbärmlich Leben!
Ich bitt' euch, gebt ihm los, den armen Mann!
Was er auch schweres mag verschuldet haben,
Strafe genug ist sein entsetzlich Handwerk."

"By God! a wretched and pitiable life! I pray you, let him go, the poor man! however heavy guilt he may have incurred, his awful trade is punishment enough."

Yes, indeed it is a wretched life, a toilsome day's work, full of deprivations, fighting against wind and weather, always with one foot on the border between life and death. For only those slopes of grass in the mountains which are almost inaccessible become places for wild hay, generally high above the forest region, that is, at a height of 6000 feet and upwards, inasmuch as from their steep inclination they can be approached neither by goats nor sheep, much less by heavy cattle, or perhaps it may be quite impracticable to approach them with a herd.

Here, where at the utmost the spring of the sure-footed chamois may find hold enough, man ventures to come in his fight for subsistence, here he finds winter fodder for the beasts which support him and his family; and as the Bible prophesies the hard lot of the workman—"In the sweat of thy forehead shalt thou eat bread"—one might add in the case of the wild-hay cutter, "As reward for your toil and contempt of death, you may drink milk."

For there are places for wild hay where the audacious venturer cannot take off his crampons the whole day, because he has to drive them into the ground at every step.

These awful districts, which may almost be compared to a possession in the moon, because their value is due to the foolhardiness of the adventurer, who sets his life as the stake, with the prospect of needy gains,—these uncultivable wildernesses would, one would suppose, be the common property of all the Alpine folk, and of the countries politically connected with them. No! the greediness and desire of conquest of man, and his striving to improve his property by his exertions, penetrate on the earth as far as the eye can reach. Where boundary stones and dividing fences of wood, or deeply-cut channels and gorges as natural boundaries, do not visibly divide mine and thine in the mountains, the common boundary of an Alpine village runs in an ideal line over rocks and dark abysses, over glaciers and fields of névé, through wildernesses which the human foot has never trod.

But within these boundaries we have to consider the position of a second line, which divides the good Alp meadows suitable for pasturage from the dangerous grass slopes, or “bösenen;” and this does not always remain fixed, for even up here, in this wildest part of the mountains, there still prevails the old unresting quarrel between the antipodes of rich and poor. For the wealthy peasant, in the consciousness of his possessions, who is lucky enough to be able to drive a whole “sennthum” of cattle to the Alps in summer, who can lift his voice with effect in the council of the commune, because he belongs to the moneyed aristocracy of the village—he will not allow the full enjoyment of his private or com-

munal rights to be lessened an inch, and demands, according to the old custom of the country, the weeds growing on the pasture for his cattle, "as far as one can go with cow and calf." This is certainly very vague, and depends upon the weight of the cattle, their power of climbing, and the risk which their owner is prepared to run in driving them to places not well suited for pasture. The poor wild-hay cutter, on the contrary, who feels the earnestness of life bitterly, who strives at his troublesome trade with danger of death, who perhaps hardly calls an emaciated kid his property, but who has just as good claims to be a member of the commune as the rich peasant, finds that the boundaries of the place he is to mow are some hundred feet lower in the Alp, when he sets about his work. Hence the claims of those who have and who have not always depend upon measurement where a satisfactory decision of the commune has not determined the boundaries once for all.

The wild-hay cutter can, however, practise his break-neck calling only for a few weeks in the year, generally in August and September. The rest of his time he perhaps works as a builder, hired workman, in autumn perhaps as chamois-hunter; in the winter as weaver, carver, or labourer in the village or forest. Either by the decision of the commune, or by the law, the day is fixed once for all on which wild-hay cutting is allowed. As a rule, only one man may go from each household.

At midnight on the opening day, the wild-hay cutter starts. At break of day he is to be on his "plangge," which he has chosen for the place of his harvest. He takes leave cheerfully of his home, of his wife and children, perhaps for ever—never to see them again. His scythe, alpenstock, crampons, a cloth in order to carry the wild hay that he gets to the "wildgaden," and a

bag for provisions, form the whole travelling preparations of the poor man. In addition, perhaps, a goat may follow him as a faithful companion to provide milk for him in his solitude. So he goes up the mountain in the night. As it dawns, he jodels clearly through the silent world of rocks, through which he climbs upwards on his narrow path. The echo sends back the morning greeting with a feeble voice, and from different sides, far and near, his comrades on similar errands answer his voice. It is from impatience and anxious desire to find out whether another may not have preceded him. For the wild-hay cutter must keep watch and ward not only against the inclemencies of the hills, but against his equals, the competitors in his business, who perhaps wish to dispute his place with him. Bloody fights have been fought before now close to the abyss, where an unguarded step would plunge into eternity.

Hay-cutting is exposed to other dangers besides those mentioned. Many a wild-hay cutter has been injured by falling stones, crumbling from high rock-walls; death has overtaken others as they tried to wade through the streams swelled by sudden thunderstorms, slipped and were washed away by the hurrying torrents. Or a sudden snowfall, which, at heights of 6000 feet and upwards, is no rare phenomenon in summer, covers up the narrow rocky ledges in a few minutes, so that they become almost inaccessible. And such cross ridges along the vertical masses of mountain are in general the only natural passes which the wild-hay cutter can use to reach his "fluhsätzen" (cliff-ledges) or "berghetten."

The warmer and more steady the weather is in August and September, the richer is the harvest of mountain hay; and, on an average, each man may bring home a hundredweight a day. He gains by this three or four

francs. If stormy weather occurs, the wind, which often roars wildly over the heights, frequently carries away the mown swathes of hay from the ridges, scattering it far round, or swollen brooks wash it away, making much toil and danger fruitless. For the wild hay generally consists of tender, thin-stalked, short weeds and grasses of uncommonly tender growth, a true lilliputian vegetation, as opposed to the heavy-stalked, high-shooting, broad-leaved hay of the lowland meadows. The fragrant "mutteri" (*Meum mutellina*), with its white umbel of blossoms, takes the first rank amongst these plants; it is considered the most milk-producing Alpine plant, to which the "adelgras" or "riz" (*Plantago alpina*) approaches most nearly. With them are found the "berg benedikte" (*Geum montanum*), creeping low on the ground, with broad leaves and great rosettes of golden flowers: the low, white-flowered "Alpenmaslieb" (*Chrysanthemum alpinum*), the tender "mannschild" (*Androsace obtusifolia* and *chamaejasme*), and the round "frauen mäntele," i.e. ladies' mantle (*Alchemilla vulgaris*), called also "thaumäntele" (dew-mantle), because the medical art of the middle ages, and popular belief, ascribed wondrous powers to the dew shaken from its round, kidney-shaped, silk-haired leaves. Between them nestles the "eberwurz," i.e. boar's root (*Carlina acaulis*), so sensitive to moisture in the air; the dwarfed alpenehrenpreis (*Veronica alpina*); the low, burning-yellow-blooming "fingerkraut" (*Potentilla aurea*); the finely-chaped "alpenschwingel" (*Festuca pumila* and *nigrescens*); the low rock "windhalm" (*Agrostis alpina*); and the "romerge" (*Poa alpina*), valuable for its nutritious powers. From this often thickly-matted weedy turf there rise sporadically the "frauen schüheli," i.e. ladies' slipper, or the "wundkrautklee" (*Anthyllis vulneraria* and

alpina); the "schaafgarbe" (*Achillea atrata*), with its dark green cup, on a low stalk furnished with deeply-cut leaves; the splendid "alpenklee," i. e. Alpine clover (*Trifolium montanum* and *alpinum*), with its noble flesh-coloured large-bloomed knots of flowers; the isolated "knöterich" (*Polygonum viviparum*), with a long stem above its lancet-shaped leaves, stretching forth its white flower-stalk, beset with red knobs; the low, sharp-leaved "rapunzel" (*Phyteuma hemisphericum*), lifting its head of azure-blue flowers from the thick turf; the variegated oat (*Avena versicolor*); the glowing violet campanulas; the hairy *Thieraceæ*; the ragged-leaved *Alchemillæ*; the *Areticæ*, *Androsaceæ*, the endless family of grasses, and all the strong aromatic mountain plants. These together compose the wild hay, which is therefore of uncommonly strong scent, is more freely eaten by the cattle, and produces a much richer milk for butter than the valley hay. In Norway the mountain peasants of the Kjölen consider it a panacea for all the diseases of cattle; they fetch it at the risk of their lives from the highest ridges and points, and keep a bundle of it as a treasure till the next harvest.

If the hay is properly ripened from one day to another, it has to be collected at a deeper, more accessible place. This part of the work is no less difficult and dangerous than mowing it. When the wall of rock on which the wild hay lies is not too high nor too much split, the wild-hay cutter simply throws the packed-up "burdenen" down, rolled up in rough linen cloths or nets, descends unladen, and collects it at the place he has chosen. If, however, the cliff is very high, so that the heavy firmly-tied bundle might be crushed in its fall by throwing it down, or if the rock is too thickly overgrown with bushes and "knee-timber," in which the ball might be caught,

the wild-hay cutter has no other choice than to carry the burden of a hundred weight on his shoulders down paths which frequently do not give room for him to put one foot before the other.

Imagine a rock-wall several hundred vertical feet in height, almost overhanging the luxuriant green Alpine terrace below, and the "plangge" of the wild-hay cutter high up on the rocky scaffolding. This vast mass, by the side of which the greatest cathedral, the most gigantic building of the earth, would be a plaything, consists of elevated layers of slate, limestone, or dolomite, placed as it were on their edges. The weathering has exfoliated particular layers at different heights, broken them, and thrown them to the valley, so that horizontal ridges like terraces run along the mighty front like cornices on a building. According to the thickness of the splintered layers, these cornices may of course be only a few inches or feet broad, and form those strips of rock or of grass when they are overgrown ("draie"), which, seen from the valley, are spun across the grey or ochre-coloured rocks like tender green cords. They are the paths of the chamois hunter and the wild-hay cutter. On the right the wall rises sharp, smooth, and vertical, to the next strip of grass on the jagged ridge; on the left it sinks as deeply into the depths. Between lies the rocky way, inclined, slippery, crumbling, often only a few hand-breadths wide. The eye can look freely over the whole valley if the head is free from giddiness and accustomed to striking impressions; an unlucky look into the bluish depths — down to the tops of the pine trees, which seem shrunk into mosses — draws one with magnetic power to the fatal fall.

But the mountain folk are so used to the size and majesty of the Alpine world, so familiar with the awful

horrors of the mountains, that up there, where any other mortal would tremble, they are living and moving for the first time in their element. Most of the accidents which happen in carrying the hay arise when the carrier remains hanging with his burden to some rocky point or bush, loses his equilibrium, and falls. The father takes his boy with him early to the hills that he may accustom him to them. At first the lad steps cautiously along the cliffs, clings firm to the rock, and his heart beats as his eyes sink with anxious curiosity towards the forest night in the gorges, to the mountain brook rustling deep below, or the silver gleaming stone-weighted roofs of the chalets, whilst the parent with his heavy burden on his shoulders follows him in steady steps, calculating whether the payment for his daily work will cover his rent to Michaelmas. But the boy feels happy; his rough independent nature, common to all the mountain folk, is breaking out, and will grow greater in his struggles with nature. What lot is then hard for the lad? Must not he follow his father's trade? He has no choice left.

Far below, where the mountains begin to spread out conveniently at the foot of the fearful walls, stand little hay barns, artless wooden huts, "Bargaun" in the Romansch, "Gäden" in the German Swiss; in these the adventurous mower keeps his wild hay through the harvest till the sleigh path in winter gives him the opportunity of bringing down all his store to the valley. Even these scanty nomadic magazines are often wanting, and, in confidence on his luck and the honesty of his neighbours, he piles up the hay he has got in the open air, where there is any defence against wind and weather. The "heu-feimen" (haystacks) are firmly fixed round poles driven into the ground, and weighted with large stones. It frequently happens, however, that when the poor man

wishes to bring in his fodder at Christmas, the mountain hares or other hungry game have half devoured his provisions.

In the winter, when the paths are deeply covered with snow and all the mountain buttresses are wrapped in their thick white coverlets, the wild-hay cutter goes with his "hornschlitten" (sleigh) on his back as soon as the snow bears—*i. e.* has grown firm and has a hard crust—up to his magazine, fixes a rough "schochen" or bundle of hay firmly tied upon it, places himself in front of his vehicle between its lofty shafts, and, setting it sliding in motion, plunges down the slopes with the speed of a railway. Even this last part of his work exposes him to great danger, as frequently, when all the snow below is frozen "pickelhart," *i. e.* too hard to be broken with a pickaxe, a milder air is breathing over the heights, or the warm Föhn wind is prevailing, and avalanches are started which bury man and burden. Hence the Tyrolese prepares himself for all contingencies when he goes up with his companions to the "hatzen," or carrying the hay, and a common prayer begins the dangerous day's work. If the frequently repeated adventure succeeds, if all return home fresh and well, the good fortune is celebrated by a united feast, called the "hatzermahl."

All the hay which is carried down on sledges in the winter is not merely wild hay; there are mountain meadows which are managed just like the rich valley meadows. If they are too far from the village or from the home of their owner, their crop, as well as the wild hay, is kept in "gädens," and either used on the spot in winter, or brought down like the other on sleighs to the valley. The audacity and skill with which the hay sleigher directs his burden of several hundredweight, rising far above his head, is remarkable. Perfectly confident

amongst the dangers which threaten him, he knows the ravines (now filled with snow) through which his icy pathway runs, even in their smallest details. With a quick glance and cool calculation he draws his circular course, so that he drives down close by the awful abyss with the speed of an arrow — a few feet miscalculation in the curve would send him down into depths whence no return would be possible. “God helps the brave,” and “no brave man grows pale at a bold deed.” These words of Schiller may be fully applied to the wild-hay cutters, especially to the foolhardy Molliser (Glarus), who once took the most direct line from the hay mountains under the Frohn Alpstock to the valley over the terrace-shaped ledges of rock. Certain signs announced to him whilst he was above that avalanche falls were to be expected. Many parts of the common route lay in the path of terror of these winter greetings. The awful death of being buried alive threatened him. Every moment’s delay increased the danger. He took his part at once, commended his soul to heaven, and chose the least of two terrors. Any one who knows the ground would consider such an undertaking madness, for it is far more probable that the adventurer would be destroyed than that his *tour de force* would succeed.

Enough, our hay sleigher resolved, but, instead of putting himself at the head of his train, caught hold behind, stuck his head into the hay, and left the rest to chance. The bold deed succeeded ; this vigorous decision saved the courageous man.

CHAP. XXXI.

“ALPSTUBETE,” OR ALPINE FEAST.

THE people's feast! this word of pleasant memory and promises of joy to which the hope of thousands springs joyfully forwards—this bright star in the dreary press of daily life—how it vanishes under the influence of transforming time, and changes in its original childish kindly character! Daily it loses its fresh spirit and character, and turns pale, without body or marrow. Splendours that dull the senses, and empty show, cover the poverty and bareness of spirit which, with an exuberance of outward display, creeps over everything, even the feasts, like an epidemic disease. The Alpine feast, however, meets us in unexpected simplicity, in its natural hearty pleasure, as a phenomenon to do us good. As so many customs and usages have still been preserved in their purity by the Alpine folk, as if the hard solid ground on which they live had passed into their thoughts and actions, we still may see the rough muscular lad exercise himself on the Alp at games which his fathers enjoyed centuries before him, giving a vigorous undaunted character to their time.

“Alpstubeten” or “Dorfeten” are herdsman's feasts, which are perhaps as old as the Senn system, which last as long as the herds are driven to the Alps. Their name brings to mind their original circumstances, as their nature and course still remains unaltered. In the



ALPINE FEAST.

scattered mountain villages, arising from ancient settlements and spreading of families, lying apart from the great roads of commerce and communication, there were no inns of any capacity till very modern times, as is still the case in Savoy, the Valais, Grisons, and Tyrol. The Alpine peasants had no need to go and spend money in their neighbours' houses; money scarcely circulates in many mountain villages the whole year through, as each produces for himself what he wants at home. They had, however, need of sociable life, of neighbourly visits for entertainment, and since there were no houses for company nor casinos in the hills, they went to each other's rooms (“stube”), and these visits got the name of “stuberta.” The designation is especially applied to those meetings of young people, who met for play, song, or dance in the largest and most convenient room of a neighbour, and these improvised meetings still take place everywhere in the Alps and Black Forest. They are however by no means always of the harmless idyllic character of these proper “stubern” meetings, but are frequently causes of great demoralisation of the people.

It is otherwise with our Alp feasts, to which, as they were equally occasions for visits and pleasure, the same name was applied as to those which took place in the valley. The day of their celebration is as fixed as that of a saint in the calendar, and in Catholic districts generally takes place on the day of the patron saint. All the mountain folk, who feel more solitary in summer than at any other time, because half the population is living on the Alp, and half in the valley, stream impatiently to the place of meeting, listen to preaching and mass, and when they have satisfied this old custom, all spiritual pastors and thoughts are done with for the day — the coming hours belong to the most unrestrained pleasure. All the

people appear in their Sunday dress, in bright shining colours. Meanwhile care is taken that a Senn, in the dress of honour of his stable work, moves amongst the companions, if not for ornament, at least for the artistic completion of the groups. With loud cries and jodelling, till the mountain walls yell it back, and the air is filled with ringing joy, every Senn lad springs with the maiden of his choice to the neighbouring chalets. Here everything is prepared for the visit,—cakes and fritters, pear tarts, and “geschwungener nidel,” *i. e.* swung cream (rich cream whipped to foam), enticing fine wheaten bread and wine : all that the art of the mountaineer can produce is spread out for a jovial meal. Then there is joking and caressing, banter and chaff, rough and unmannerly enough at times, such as is the custom up there.

Once more the young people separate. The maidens disperse singing in groups, seek the best known places, and compel the gnomes of the mountain walls to second them with echoes. It is the most thorough overflow of spirits, the elasticity of humour and fun at its utmost stretch, which is striving to unburden itself, and seizes every occasion of working off their superfluous happiness.

The sun stands high. The infinite ether glows with its deepest blue. The joyful cries are rising from every corner and all the slopes. Wherever a chalet lies hidden behind a group of firs, where the path leads over a mound to another Alp, or the narrow serpentine way crosses the gorge to the neighbouring pastures, the people are streaming up, eager for enjoyment. Down on the flat meadow, what a throng is undulating and interweaving ! There is the feast fully begun. “Wer gerne tanzt, dem ist leicht gepfiffen” (It’s easy piping to those that like to dance). Lifted on a block of stone, the orchestra is beginning its performance. It consists of two self-taught

musicians, who are playing lively tunes, in their shirt-sleeves. One has the "hackbrett" on his knees, the great-great-grandfather of all pianos, from whose strings he draws clear metallic tones in sharp jumping rhythm by help of a steel instrument. His companion is a fiddler of equal originality, full of wit and overflowing fun; he adorns the melody, already sufficiently inspiring, with all kinds of quips and cranks, quivers and vibrates through his whole body, and beats time with his feet to his musical arabesques. The poor fellow is sweating all over, and, to have some protection in his severe work, he has tied the canopy of a huge red cotton family umbrella to a long stick, and stuck it up behind him, to go through his day's work in its faint shadow.

This just suits the people. They must and will have music. The virtuosi of a princely chapel would be useless; with all their precision and clearness of play, they would be unable to hold the fascinated Alp folk balanced on this trembling height of joyfulness, as does the dirty, diabolically screeching village fiddler. And now the dance itself, the primeval dance which the Indians and wild races still dance at their feasts, the great round ring of arms which, fastened in a chain, reels round the brown mossy clump of rock. What is this primitive jumping and springing in comparison with the fairy-like grace of the artificial dances at our *soirées* and balls? Still there is grace enough in it, because nature is in every turn of the bodies. The lads have caught each other's hands, and, leaning against this manly arm-chair, as in a cradle, the "Sennerin" places her arms gently on the shoulders of her two neighbours. There is a coquetry in this figure which has its charm, and shows beautiful undulating forms. Additional tours are introduced. A fellow with his feet trembling and twitching as though a galvanic stream

was passing through him, catches his partner by the waist with both hands, whirls round in a circle just large enough for four human feet, pierces the air with his fresh hearty jodel, and swings the laughing child of the Alps high over him like a plaything. So it goes on with noise and fun, a spectacle that vanishes as it grows.

Such is the internal kernel, the centre of pleasure and happiness. The scene is surrounded by rich groups, every few men forming an effective picture. Even the cows have come up, and stare with astonished eyes at the crowd, that is so strange in their generally quiet haunts. They make known their sympathy by loud lowing : is it a protest against their luxuriant grass being so carelessly stamped down, or are they expressions of approval in the language of cows? The Senn, however, who was enjoying himself over a glass of wine, will not put up with the intrusion of his household beasts and chases them away, galloping with tails in the air, to the terraces set apart for their pasture.

At last the whole circle is glowing, panting, and perspiring under the sultry rays—the umbrella fiddler and the “hackbrettli” man, the lads and the lasses, must rest from their excess of pleasure.

Then a new circle, which we had not yet observed, attracts our full attention. A big stone weighing a hundredweight flies through the air and falls with a dull thump on the ground ; a roar of laughter follows. This is the proof of strength in putting stones, the primeval game of the Alps, a recollection of the rolling stones at the battles of Morgarten and Sempach, which crashed down, like the foul fiend, into the heavy armed ranks of knights and troopers, and threw them to the earth. Here it is only fun, only boys’ play on a large scale, but it shows the vigorous manly spirit which rules in the mountain folk.

The Senn grasps the stone in his strong hands, and raises it with apparent ease to his shoulders, whilst the palm of the right hand properly bears it. The mark at which he is to throw it is about a dozen paces before him. With a swing of the upper part of his body, he seeks to hit upon the right moment, and suddenly striking out with his arm, he casts the stone at the mark. It is generally a bet for half a bottle of wine. Gymnastic exercises have also been known in the Alps for centuries.

The climbing talent of the goat-boys is as old as their class, and for accuracy of aim William Tell has been an historic proof for more than five hundred years. The most entertaining of all such gymnastic performances may still be seen at our Alpine feasts; it is the wrestling,—“schwingen,” or “hosenlupf.” In Appenzell they are immediately after an Alp-feast; in the Entlibuch and Emmenthal, in the Bernese Oberland and Unterwalden, they form popular feasts by themselves, which have certain days appointed for them, as the Stubeten have elsewhere. Some take place on the Wengern Alp and on the great Scheideck at the foot of the Wetterhorn—the first much frequented by the people from Grindelwald and Lauterbrunnen, the other by the inhabitants of Grindelwald and the Haslithal. It is commonly on a border Alp, to which the most pugnacious youths from each valley ascend, for it then happens that the victory is gained by the party from one of the two valleys. It naturally follows that those who last left the ground covered with glory are now anxious not to lose it, and apply their whole strength to do all that is possible. The party conquered before now strive to revenge their disgrace, and to leave the place as conquerors this time.

When such a wrestling match is being got up, the men who are to enter the contest abstain from the

hardest kinds of labour, take care of themselves, and keep to nutritious foods and drinks. On the wrestling day the fighters of both sides meet at a public-house. Each one chooses an opponent in the opposite party with whom he wishes to have a round, and they meet with hearty friendliness and unanimity, drinking to each other. The hour strikes. The opponents go up arm in arm, preceded by music, in a long procession to the wrestling place, where a crowd of people is already waiting. The court of umpires, old trustworthy men, has been already chosen. The rest of the people form a ring, in the midst of which stand the wrestlers. They have made themselves ready: their shirts and "schwinghose" (wrestling-breeches) are the only clothes they wear. The schwinghose are made of strong tough cloth, which must be strongly sewed. It is rolled halfway up the thigh, over the naked foot and knee, and has a roll round the waist to be grasped. Thus prepared, the wrestlers enter. The manager whom they have chosen determines the order in which the pairs are to contend: first the weaker, and then rising by degrees to the strongest. First of all, both parties shake hands heartily, to show openly that they have no hate or spite concealed in their hearts, and that the wrestling is to be free and friendly. The collar of the shirt is opened, in order that it may not interfere with the breathing; the shirt-sleeves are rolled up above the elbow, so that the arms are bared and can move more easily. According to old custom, there must be nothing laced in the whole dress, and one must be precisely like the other, because in a long obstinate struggle any trifle may give the decision by producing earlier fatigue. Thus prepared, the first pair enters the ring; joy, cheerfulness, confidence, and eagerness for the struggle shine out of their eyes. The

grip follows quietly, *i. e.* each places his right hand firmly in the girdle of his opponent, the left in the rolled-up band of the trousers on the thigh, or, as it is called in the Entlibuch, “ins Gestöss.” All false and underhand dodges are strictly forbidden, such as rubbing the girdle with tallow, to prevent the opponent’s obtaining a secure hold. The grip may take place either standing or kneeling, the head of each lying upon the adversary’s shoulder. If they are two experienced wrestlers, they circle round for some minutes, moving cautiously up and down; neither of them tries to get the first hold till he thinks the right moment is come. As each holds himself on the defensive, he expects every moment the sudden attack of his opponent, and his whole attention is therefore directed to standing firmly. The least slip, the slightest weakness of his opponent is immediately attacked by an energetic grip. It sometimes happens that a pair “dusen” (as it is called in the Entlibuch) so long at each other, that they leave off from fatigue, throw themselves down on the cool turf to take breath, drink a glass of wine like brothers to get new strength, and rub their hands with earth to make the skin rougher. During the “dusen” perfect stillness reigns in the ring; all listen in suspense for the first grasp, and as soon as this takes place, and the desperate wrestling, the leg-twisting and pulling, the lifting and tugging begin, the spectators of both parties follow every motion with feverish haste, with inquisitive looks, and beating hearts. Half-suppressed calls, stifled interjections, and exhortations accompany the fight, till suddenly, by a single turn, by an unexpected grasp and effort, one becomes master of the other, and throws him to the ground. This single defeat, however, does not decide the victory. “Eines Mannes Red ist Reine Red, man muss sie hören alle

beed" (One man's say is no man's say: one must hear them both). On this principle, opportunity is given to the beaten to save his honour as wrestler, and it frequently happens that this time luck is on his side. He who throws his opponent twice on to his back is the final conqueror.

When the wrestlers of two valleys contend for the honour of their party, as the Unterwaldners and the Haslithal men on the Breitenfeld Alp above Meyringen, or the Entlibucher and Emmenthaler on the Schüpferberg or Ennetegg, a man of the party who was last thrown comes forward and tries his fresh strength against the conqueror in the last match, whose strength is by this time tolerably exhausted. This order is kept to with particular strictness when it is a contest for a set prize. If, however, it is only a common wrestling match, any number of wrestlers may come from two separate parishes to try their strength against each other.

If it happens that in a solemn wrestling match the strongest and most skilful combatants of the two parties are the last, and each valley places its final and decisive hope of victory on its man, and thus it is a question of saving the honour of the day for a whole community, a special kind of spectacle takes place. The two wrestlers fearing each other try to keep on the defensive, each one to avoid a fall, and make the victory of his adversary impossible. Then both generally give up the ordinary way of wrestling. When the two gymnasts have taken hold regularly, they let themselves down on the right knee, each accurately measuring the position of the other, and get as far off as their grasp and muscular tension will allow with the lower part of their bodies. If one fears still to be thrown in this fashion by the su-

perior strength of his adversary, he lays himself flat on his stomach, and the adversary must follow him. In this unnatural position the two frequently strive for half an hour, wind on the earth like creeping snakes, and strain muscles and sinews so immoderately that their faces seem a reddish brown from the fearful exertion of strength. If neither can overcome his adversary by endurance, strength, or cunning, they stand up at last of their own accord, but tired to death, on the fighting place, recognise each other's manliness with a hearty shake of the hand, and neither party can boast of the day's victory. It is wild, almost barbarous, this exhibition of physical power; but it gives proof of a manly fighting people, of a race that is not effeminate, and has still courage and endurance enough to fight for its honour, its freedom, and its fatherland, with its most resolute determination.

The most original wrestling match, wherever these trials of strength are practised by the people, takes place in the refectory of the Capuchin monks at Appenzell, in the presence of the monks. In autumn young strong lads bring from far and near, on an appointed day, offerings in kind of wine, corn, wood, &c., as free gifts to the monastery. For these gifts the monks have a substantial meal prepared for the donors, and as dessert, when the tables are cleared, a wrestling match takes place in the refectory by the men for the amusement of the monks. The monks stand on tables and chairs, take the most lively interest in the course of the contest, and often laugh so heartily that the wrestlers take up the laughter of the monks, till they can wrestle no longer. This monastic arena is so well known that the men not only invite each other all the year through to the monastery for the “Kloster-lupf,” but herculean fellows challenge any one in the whole

country, who wishes to measure himself against them, to appear at Appenzell on the appointed day.

The rest of the day passes at an alpstubete as it began, only that the fun rises instead of sinking. With unwearied pleasure every maiden jumps with the hand of her lad down over stock and stone to the valley.



WOODMEN.

CHAP. XXXII.

TIMBER FELLERS AND FLOATERS.

“CINQUE ! sette ! tre ! Cinque ! quatter ! due ! Hahahahaha !” rises in a hoarse roar from the osteria of Cremaglia. The peasants of this Tessin village, lying on a high mountain terrace, sit by full cups of the fiery Cugnasco wine and play at their beloved game of mora, dashing their fingers down on to the table, and screaming at each other like madmen. In Germany, and on this side of the Alps, one would think they were really gone mad, as they rave at each other in all love and friendship ; that is the Italian blood. The mountaineer of the Levant, or the depth of the Val Maggia, is a quiet fellow enough till his passions are excited ; quarrel, company, and strong drink quite transform him, and turn the generally quiet thoughtful man into a hot-blooded, raging coward. What is it that excites this handful of people so much on a work-day ?

The whole commune of Cremaglia is officially called together. Gianella, the great wood speculator of Comprovasco in the Blenio valley, has bought a large forest from the commune, and is giving a drinking party in consequence. The ratification of the treaty is thus settled by the municipality, and the solid ringing purchase-money does not come into the budget of the patriciate, to build streets with or to support schools and almshouses, but the

“vicini,” or neighbours of the commune, divide the money amongst themselves, so that each gets several hundred lire. Therefore the “confederati” of Cremaglia are in such good humour to-day.

Every honourable German-Swiss citizen, who looks with pride at the “Gemeinde-Sackel” (communal budget), who takes some interest in the economical position of his native place, or any other civilised man who has cultivated conceptions of the arrangements of a properly managed common estate, will be startled at such a simple application of the purchase-money of communal goods; the Tessiner peasant is not. He has no conception of the necessity of a regular management of the forests by the State. His mountains have plenty of high forests, at least in his opinion, which will last his time and his children’s children; and by that time, if there is want of wood, new forests will be growing up. So the peasant reasons. There were once square miles of forest which had not been used for centuries. When the price of wood rose in Lombardy, Italian speculators came into Switzerland, bought wood for a trifle, and whole mountains were robbed of their costly treasures.

A large, fine high forest, far in the recesses and deepest valley gorges, at the foot of the Rheinwaldhorn, is now about to fall under the axe of the borrhatori. The forest lies far from the road, and a few days’ journey from the Lombard place where the wood has been bought for the sawmills. The wood would be raised to an enormous price if transported on wheels, and no one would buy it; hence other means of transport must be thought of, if only to bring the wood from the deeply sunk corners of the mountains into the neighbourhood of human communication.

Wherever large mountain streams come down from the

Alps, the valley walls are very bare of forest. The timber, whose weight and volume bears no relation to its value, is at a small distance, a natural product not worth the carriage. Hence rivers have been claimed for the transport of the timber, and thus the axe has first attacked those forests which lay in the neighbourhood of strong water carriage. The southern side of the Alps is far more bare of forest than the northern. The dense population of Italy has for a long time not been able to satisfy its demand for wood ; hence the Alpine forests were attacked, and retreated step by step towards the kernel of the mountain treasures before the plundering speculators, till that remarkable bareness on the southern slopes was produced, which strikes us so much in crossing the Alps. The forests most easy of access fell first, and when they were thinned the timber trade penetrated deeper into the lateral valleys and the retired wooded gorges, which once were rarely trodden by a human foot. Here too, as the mountain's kernel is more nearly approached, the inclination and rending of the ground increases. The larches and red firs climb boldly, like genuine storm trees, up the steep cliffs, which are often scarcely inferior in slope to a church steeple, so that each one peers forth far above the head of his neighbour. Far in the mysterious recesses of the great mountain folds, there are isolated cones, surrounded by cliffs which bear splendid forest canopies on their rocky shoulders. They stand up inaccessibly, like a group of tree-sentinels, or like the small and courageous garrison of a fortress, since no one, so long as there was more convenient wood to fell, hit upon the idea of attacking the exclusives up there. Many an ancient lightning-split stem is indeed mouldering on the ridge, many a boughless shaft is shining like a silver-coloured splinter up from the darkness, whilst the young growth, fresh and

strong, is overtaking the old one. Where in the outlying mountains everything has already fallen under the axe of the woodman, this little capital, hitherto respected, is attacked. The forest speculators offer, all the bold forest trees are condemned to death, by shaking hands, the signature of the podesta, and the counting down of the sum of money, and next year a cold grey surface of rock is grinning down into the solitude.

The peasants of Cremaglia have already sold such a piece of forest, and are getting jolly over their bargain. For they, as corporation, would not have brought down the timber from its retired corner all the days of their life; a firm speculative will is wanting, costly preparations, buildings, and disposable capital are necessary, and Signor Gianella has plenty of all these. To-day the cup is still circling through the noisy company; to-day every one is enjoying his life. To-morrow the dangerous work begins; who knows whether he will see the last stem fall—whether he will not himself be first resting with crushed limbs at the foot of the rocky wall?

The inhabitant of the Canton Tessin is quite a different man from the German-speaking mountaineer. The cold resolution, the mountain life with its hard fatigues and deprivations, is united with the restlessness, the hot-blooded, quick-acting Italian element. He is an excellent workman, prudent, sharp-sighted, inventive, and not slow, when it is required, to invent clever schemes and ways of helping himself, which lighten his labour; he is also enduring, industrious, and sparing. Therefore he is often employed on this side of the mountains in road-making. Every one of them brings a certain sprinkling of engineering capacity into the world with him, and he applies this with remarkable ingenuity, especially to the felling of the forests.

Whilst thousands yearly seek their bread during the summer in foreign parts, as plasterers, glaziers, stone-breakers, and workers in earth, and live sparingly through the winter in their remote Alpine village, with wife and children, on the money they have saved, thousands of others work at home as "Tagliatori di Selva," and "Borratori." The first are the proper wood-fellers, men with saw and axe, who give the death-blow to the tree; the last, often Bergamese, are those who, by inventive devices, get the stems out of the labyrinth of the mountain wilderness down to the river, which then bears the rocks playfully on its back.

If we have admired the talent of the goat-boys, we here find worthy companions, natural gymnasts, whose equals cannot be found. They run like woodpeckers, with climbing irons for claws, up the stems, and hew off the boughs so that the slender staff, adorned only with its crown, stands up like a torch. Then comes the work of the axe. Where the moss embraces the stem most luxuriantly is the most sappy texture of the tree, and there the axe finds the most yielding place to its cuts. As the hair is shorn from the neck of the criminals before the executioner delivers his sword blow, here the woodman's hand bares the stem from the chains of ivy or thick cushions of moss, which passed their tender parasitic life on the strong tree. Then it glances clear in the sunshine. Blow on blow rings through the wide quiet forest, and the murdering axe penetrates deeper and deeper. The chips fly hissing through the air, the wound grows greater and comes nearer to the sound internal tree kernel. Now, the axe is no longer sufficient; after a short rest, the woodmen take the saw. It is a dangerous position which they have chosen, for the ground sinks steeply from their sight. The foundation on which they

stand oscillates with the stirring of the root-work of the tree they are felling. Rent after rent, and cut after cut sinks deeper towards the sound side, opposite the axe wound, till here too the feeble power of man gives way, and the murderous instrument refuses its help. Then comes the last means of torture for the noble tree standing resigned to its fate. A broad wedge has to stretch the yawning cleft, and the eating teeth of the saw now work more freely. Now, there is a groan through the tree like the shudder of death; his top trembles and wavers gently to and fro; he still arms himself; the firm tough power that lives in him holds him up; then the last vital fibre rends, a rattling crash, and the pillar of the forest sinks with a plunging fall, till some other stem or projecting tooth of rock stops its wild flight. Many a woodsman has been swept away from his post by the boughs of a tree charging down the mountain, before it had been sufficiently felled, and carried over the cliffs.

So the slaughter continues. As often as part lies on the ground, the splitting of the wood into blocks or "borre," of a certain length, and the stripping off of the bark or "strapina" begins. Up till this time, the felling of the tree has little that is peculiar, except the dangerousness of its standing place; the like may be seen in other forests. But now comes the work of the "Borrori." The heavy solid rollers could only be transported an hour's distance down to the river by a great exertion of strength, if some other much lighter means of transport had not been invented. These are the "Sovender" or "Seguender," *i. e.* timber slides or viaducts, which frequently, not only equal, but even excel the ancient aqueducts in boldness of construction. With an exquisitely cultivated sense of locality, with a power of accurate

judgment by eye, and with a sharpness which would be wonderful in many an engineer, they spy out, without help from map or compass, without tables of measurement, or hypsometrical data, ideal lines reaching for hours over abysses, through forests, along walls of rock, sometimes in a straight line, sometimes in a number of windings, which preserve the right elevation and come out at last to the chief valley. They use every small advantage that offers; a single projecting tree, an overhanging wall of rock, even the roofs of chalets have to serve as props for their constructions. These "Strüsone" or timber slides, are built with uncommon accuracy, of from six to seven smooth tree stems; they are three or five feet broad, basin-shaped, provided on both sides with projecting rims, and preserve a slope of at least 10 in 100. So long as possible, they run on firm ground, over the backs of the mountains; when the direction no longer suits the "Borratore," he leaves the safe foundations, and suspends his path from the naked walls of gneiss or granite, just as the rain-gutter runs under the house eaves; and where this becomes impossible, it spans the track with a desperate jump, at a tower's height, through the air, from one ravine bank to another, in lines comparable to the boldest bridges. It always preserves, however, approaches as convenient as possible, on which an accustomed mountaineer may pass over the giddy depths.

When this ingenious, dangerous, and expensive work has been erected called "Las" or "Laass" in the Tyrol and Styria, the Borratori and their men wait for the winter. As soon as the first firm frost begins they hasten up to their trough, pour water diligently over it, so that its cracks and clefts are filled with ice, and the whole interior surface of the canal is covered with a smooth icy crust. Often when the Föhn begins unexpectedly, the whole carefully

produced level surface melts away again at night, and the work has to be done over again. If everything is prepared in this way the transport begins at last. The hardy workman, despising the icy wind and wildest weather, climbs up the steep snow slopes to the place where the blocks are laid out. Winter has cast its white sheet of flakes over them, and only vague outlines show where they are buried. The first work is now the "Portarunt," *i. e.* the carrying the timber to the slide. This is done in different ways. Either when the snow has a hard frozen surface it is sufficient to set the blocks in motion, which then glide down over their winter path to the place, where they are brought on to the Strüsone, or a man fastens them together in the form of a triangle, places himself on the top of them, and goes down steering with his feet, or, as in the winter carrying of the hay or wood in the other Alps, small sleighs are used. This work of carrying down to the path is generally kept till winter, because the blocks being rough, heavy bodies are much harder to move when the ground is not covered with snow.

When the proper passage to the valley begins, the "Borratori" divide themselves as sentinels at measured distances, like the watchmen on a railway, along the whole sovranda, armed with long strong spears; they especially place themselves at points where in consequence of the windings of the trough the blocks might easily hitch as they slide down. At such places too the "Eisriesen" (as they are called in Lower Austria) are raised at the outer side, to prevent the beams springing up in their swift course. The stems are now thrown in, one after the other, and piece after piece plunges down at a fiery speed, far exceeding the pace of a locomotive, crossing a distance of several hours across precipices in a few moments. They generally carefully avoid throwing in crooked stems,

because they easily cause lodgements, or leap over the trough. If such a confusion arises, the *Barratore* telegraphs the interruption to the next post by a loud whistle, and the signal goes from man to man, up to the place of starting, where they wait till the hindrance is removed. A new signal conveys the order to continue. When several dry, frosty and biting cold days with clear moonlight nights follow each other, they work on without stopping, to profit by the favourable disposition of the weather. Only under these severe voluntary deprivations, and by efforts which almost produce exhaustion, is it possible to continue the work. Their way of living during the work is simple and modest enough; polenta or maize-meal porridge, and a little cheese forms their whole support. Spirituous liquors, to give a stimulus, must be entirely avoided; for as they have frequently to stand still for hours in great cold, the use of brandy might produce sleep, which would result in death by freezing. But the danger of losing life by the fall, or sudden leaping of the trees out of the trough is constantly present. In spite of the pointed crampons on his feet, the position of the *Borratore* on the ice-covered cliffs is very unsteady. If blocks have stuck fast in the trough, an energetic application of strength is frequently required to start them again: the first, second, third shove will not do it. The blocks are wedged together, so that great force is necessary to loosen them. The *Borratore* gets on to the smooth edge of the trough and tries to help with his axe, but the stoppage will not move. Then he ventures rashly on a block to move one of those below it a little; and before he suspects it the whole burden starts again. If he is lucky, an instantaneous spring saves his life; but many have lost it when their leap failed, or they perished miserably torn down by the hurrying logs, and carried senseless

down the abyss. There are few "holzer" (woodmen) who do not stagger about in their old age with their feet frostbitten, or their bodies otherwise maimed. And still a fresh aftergrowth is never wanting, who know their lot in old age, and yet devote themselves to the dangerous calling.

Where the forest slopes straight to the great water-channels of the Alps, to the swiftly streaming rivers and strong mountain brooks, little preparation is wanting to carry the building wood and fuel further: the water there has to perform its old transport service that happens in all the Alpine districts; but the Alps have here again their romantic and sublime peculiarities. Without considering the state of the water, the wood is felled and laid in the often half dry river beds. If the brook rises through rain or melting snow, it carries away the goods entrusted to it for transport, and this is the moment which presents new and unknown pictures. In the description of the "Rufe" it was shown what fearful destruction may be caused by the wild waters, when they have been dammed up, and suddenly force new paths. As the inhabitant has to look out for them, so here the wood floater must seize the moment and help when a stoppage is threatened.

And in the midst of the excited element, where the waves hurry it down with furious rage, the floater risks himself with his hook, and opens here, and pushes there, till the heavy logs roll tumbling past him. The rain pours down in thick streams—he does not put himself out. That's his calling, he knows no other. And if the stream forces itself through a black rocky gateway, in which huge stony fragments prevent a free exit, the fearless mountaineer lets himself down by a thick rope to the grisly depth, and half hanging over the wildly foaming waves, perhaps

planting one foot on the rocky wall, he labours with restless zeal, to gain a wretched day's pay.

During the wood floating in the mountain waters which stream down from a steep incline, great blocks of stone come down with them from the Alps, which a dozen horses could not move from their place. These of course stop up the free river bed, and hinder the undisturbed passage of the wood. In such cases the floaters have to descend with mallet and chisel into the midst of the roaring stream, and drive holes into the washed down ruins of the mountain, to blast the unwelcome guests with powder. Unfortunate accidents often happen, which cost the life of the workman. But even in floating the felled jammed logs, when the floaters have to let themselves down by ropes (as related) into deep gorges, they often fall victims to their calling. So it happened on the 2nd of October 1860. In the Schanfigg, a few hours from Chur, four floaters were busied in the Plessur gorge in starting lodged timber. A very skilful floater, named Christian Jäger, hung like a spider from a rope, and began to work with an axe whilst the others held him up, when a warning signal cry came from the watchman. But at the same moment a mass of broken stone crumbled from the cliff, and buried all four in the river with its débris.

CHAP. XXXIII.

“AUF DER JAGD.”

THE mountaineer is a steady, solid, simple fellow in all the utterances and relations of his life. Sparing as he is in his wants and unsophisticated in his manners, courageous in danger, and enduring in the hardships of his trade, he is just as bold and obstinate, vigorous and self-denying in the chase. It is perfectly in unison with his life, and the mighty sublime nature which surrounds him.

The pursuit of Alpine game is, both in locality and method, subject to quite different conditions and circumstances from the chase elaborately got up in the hills or plains for purposes of science or amusement; most of the practices, which are there admissible or even enjoined, and the accurate knowledge and ready handling of which point out the accomplished huntsman, cannot be applied in the Alps; there is no systematic forester's craft which can be theoretically taught in books, to produce an elegant knightly comedy, but the chase is as unnaturally rough and wild as the Alps themselves. He who has not the right stuff in his bones and blood, muscles and sinews, who cannot set his face laughingly against dangers and hardships, whose eye cannot look straight and without giddiness down abysses, had better leave his rifle at home, or try his luck in the



CHAMOIS HUNTERS.



withered stubble and along the green fields, where the hound may help him to catch the hare, or bring the covey of partridges within shot. On the Alps there are wild beasts enough, bears, wolves, eagles, and vultures, or the fugitive far-seeing chamois, or the sly, shy ptarmigan, and grouse. A man may be a perfect Nimrod after the red-deer, or have given the death-stroke to many a wild boar, without being able to kill one of the best known Alpine beasts.

In the first place, a man must have marrow in his bones, a light, firm tread, which, when the screes and crumbling stones give way on the mountain side under the hard spiked shoes, still hastens on steadily and coolly; he must be able to help himself on the labyrinth of crevasses, or on the smooth treacherous snow slopes; he must not be afraid of desperate leaps on the hard limestone cliffs, and go along the grassy ledges of the precipices like a tiler along the cornice of a church roof; in one word, the Alpine sportsman must be a good, lasting mountaineer. One cannot ride on a light hunter into the recesses haunted by the game, his own firm foot must lead the sportsman up to his work in the wilderness of jagged Alpine rocks. Then too he must be acquainted with the country in which he has to try his luck. He must know the mountain masses and their relations, the ridges, passes, points, and crests, the internal connection of the gorges and rocky gullies, that he may not be “pounded,” as once was Kaiser Max on the Martinsward in the Tyrol, or Rudolph Bläsi of Schwander, in that adventure which makes one’s flesh creep, and has been commemorated by the poet Reithard in his poem of “The Two Chamois Hunters.” There is scarcely a mountain sportsman who has not already been often in such scrapes, and only saved his life by a despairing leap.

How many have already been killed by falls or starved to death cannot be calculated. And, finally, he must be able to go without food and drink, rest and warmth. If we reflect that the chase generally takes place in the mountains, when the Alps are left by the herds, so that no milk warm from the cow, nor slice of bread is to be got at the chalets, that the sportsman often has to wander four or five days in the wilderness, without ever descending to his house deep in the valley below, that he has, therefore, to separate his meal times so to make the most of his scrap of dry bread and cheese and his flask of "Chriesiwasser" (Kirschwasser)—and remember that not even the rough layer of wild hay in the needy chalet offers him a couch protected against cold and weather, but that the man is often compelled to sleep on hard stone, in any kind of cleft he can find in the rocks when the clouds conceal the heights and he cannot stir from his place but at the utmost peril, —he will confess that it requires a body uncommonly accustomed to hardships, besides the properties enumerated above, to venture upon hunting in the Alps. The noble chase in the meadows and forests of Germany does not require all these bodily preparations.

The chapter of chamois and chamois hunting has been exhausted by that thoroughly experienced Alpine traveller, F. Von Tschudi, in his "Thierleben." As we glance at it, we shall only relate a few characteristic hunting adventures, to fill up the framework of our picture.

Skill in tracking and knowledge of the game are, after the bodily requisites we have enumerated, the first necessities for the chamois hunter. He must search out their standing places, pasturages, and sleeping haunts, to be able to calculate with any certainty in what place he will

probably meet chamois at a given time. "Spittler Jan" of the Grisons Münsterthal, a musician by trade, but one of the most desperate chamois hunters, is said frequently to have won wagers by pointing out accurately the place and time where so many head might be seen. If the hunter knows accurately the place where he is to look for his game, he starts, according to the distance he is to go (if he hunts alone, as the best chamois hunters always do), about midnight or soon after, and climbs as high through the silent night as he can do without prejudice to his chase. He has to observe carefully the direction of the wind, that it may not bear a warning sound or scent of his coming to the chamois. If he is behind the beasts, which are still lying quietly on the grass, and have only posted the "Vorgaiss" on a lofty block of rocks, he creeps, still under protection of the twilight, as near as possible, and endeavours to conceal his body behind any lump of rocks or tree trunk. Here he waits, ready for a shot, till the break of day. What infinite carefulness and prudence is required for these cat-like creepings, what exciting lying in wait, with the utmost coolness and quiet! When the beasts have roused themselves, he chooses his victim and fires. It often happens that the resolute hunter, before the frightened chamois have found out the quarter from which they are threatened, knocks over a second beast with his double-barrel. If he hits, the chamois makes a high bound and falls over; but it often happens that beasts struck, but not fatally wounded, are off and away with the whole herd. There are occasionally large herds of this game which remain together till the pairing season. The well-known mountaineer, Gottlieb Studer of Berne, once saw a herd of sixty feeding together. Solitary hunters do not generally take dogs with them.

The most accomplished chamois hunter of the present time is perhaps Ignaz Troger, of Oberems in the Valais, at least the shepherds on the alps of the Turtman and St. Nicolas valleys tell wonderful stories of him. He seems to be a modern Colani of that district, who has silently usurped several square miles as his exclusive hunting ground, into which no other hunter ventures. Besides this, the popular belief surrounds him with a mysterious legendary nimbus, and makes him a Freischütz, who can hit everything that he aims at at every shot. It is at any rate acknowledged that he is the best shot in Canton Valais, and probably the circumstance that by a skilful use of his observations he has shot perhaps three or four chamois in one day, cleverly hidden them, and then brought them down one after the other to his house, may have given occasion to all kinds of fables. He is at the same time the rashest and most adventurous mountaineer; if the ascent of the Weisshorn should ever be possible, Troger would be first on the top. So the Valaisans maintain. Another first-rate shot, who kills yearly from twenty to thirty chamois, and has already killed two bears, is Battista Margnia in the Val Calanca, who travels during part of the year as a glazier in German Switzerland, especially the Canton Glarus. In the Grisons, Benedetto Cathomen of Briegels, in the Vorder Rheinthal, is said to be the greatest chamois hunter, and after him the celebrated bear hunter Fili, postmaster in Zernetz; Jacob Spinaz of Tinzer; Zinsli, of Scharams, and others.

The combined "Treibjagd" (driving chase) of chamois, undertaken in company by the less distinguished hunters, is less dangerous. It generally takes place in the outlying alps, which are poorer in game, and in many respects is like the organised battue of the plains, as the hunters are

posted at different points and dogs used for driving the game.

This way of hunting has, however, its special difficulties, which, from their nature and origin, are less liable to occur than in the solitary chase. A plan or certain understanding between the drivers and the hunters must of course be arranged as in other similar hunts. If the order determined upon is not accurately kept to, owing to some of the unforeseen mishaps so easily possible in the hills, a complete failure in the day's hunting may be the result of many efforts. Our picture represents such a moment. Three experienced shots of Appenzell were hunting on the Gloggeren, that lofty wall rising south-east from the See Alp, which one passes on the way from Weissbad over the Meglis Alp. One of them went by this lower path, a second higher up over Marwies, and the third hunter over a narrow grassy ledge on the rocky wall between the two first mentioned. The chamois were driven along this grassy ledge. The highest and lowest had easier going, and came earlier to the place where the combined shooting was to begin. The first saw the beasts coming to him, coming directly towards his rifle, and waited, looking out constantly for the third, who was driving them along the grass ledge. The chamois come gradually nearer; he is afraid of losing his shot, lies in a feverish state of excitement, fires, and, frightened at the report, the beasts turn and fly hurriedly along the ledge the same way that they had come. Just at a narrow sloping place, scarcely broad enough for a man to pass where it bends round a projecting rock, they came in their wildest flight upon the hunter climbing toilsomely upwards. If the two parties had met upright on this giddy rim of rock, the hunter must infallibly have been dashed over a cliff sinking for more than 100 feet, as the

chamois would instinctively in the agony of despair have tried to squeeze themselves between the rock and the hunter. The man prudently observed this, and to save his life, threw himself down and let the whole herd rush at a flying leap over him. Another hunter in Glarus, in a similar position at a critical place, thought that he might secure his booty by a quick resolve, and cowered down sitting, wedged firmly against a rock, and shot. The charge missed, the chamois jumped over him, but touched him in its bounding elastic spring with one of its hind hoofs on the jacket, and tore its highest button-hole; a hesitation would have infallibly sent both over a crushing fall.

The following incident is related of a Tessiner chamois hunter from the Val Blegno. Two of them had gone out to drive. One of them fired, hit the chamois in the shoulder, which, though wounded and bleeding, still ran away and met the other hunter in a defile between two colossal blocks of rock. Covered by the rock so that the excited beast could not see him, he took aim and pulled the trigger, but the gun missed fire. With quick decision the Tessiner threw his gun away, sprang upon the chamois, who could get neither backwards nor forwards between the rocks, made a lucky snatch at his horns with first one hand then the other, and allowed the beast with a display of extraordinary power to drag him thirty or forty paces over turf and rock till close to a precipice, where it fell down exhausted. Two or three bounds more would have dragged them both over it. Here, on the brink of the cliff, another struggle began after a second in a lake of blood. The hunter caught firm hold of a tough twig of firwood with one hand, whilst he grasped the animal's horns with the other, kneeling at the same time on its neck. He waited so a few minutes till

his companion came up, and with a few stabs from his bread knife killed the beast, resisting to the last.

It very seldom happens, in ordinary Alpine tours, that the travellers see chamois even at a great distance. There is one place where, early in summer, chamois may be seen almost every day. This is in the Churfirst Alps above Wallenstadt. These mountains, between the Speer and the Gonzen, have been officially declared free mountains; no game may be shot there under heavy penalties. Any one who passes the night at Wallenstadt and climbs the Alps Lösis and Büls early in the morning, may easily manage to see chamois in addition to a noble mountain panorama. The path is very easy, even for ladies.

Bear-hunting is not, like chamois hunting, a passionate pursuit of sportsmen, nor is it pursued for money: it is either—and that very rarely—an involuntary proof of courage for the mountaineer, produced by accident, or an intentional, very dangerous internecine fight against the dreaded plunderer of the herd. In both cases this chase is no less difficult and dangerous than the other, only that the danger consists less in inaccessible country than in the nature of the game to be killed.

The peculiar home of the bear in the Alps is in the cantons of Valais and the Grisons. As the most thinly inhabited Alpine country which still possesses the thickest and most extensive forests, and broad, little trodden, mountain districts, it offers an undisturbed retreat to the great beast of prey. Not a year passes in the Rhætian and Valaisan Alps, but the message comes down to the valley at one place or another—the bear has been again carrying off sheep, calves, or young cattle. But often, to restore the feeling of universal security, the joyful report quickly spreads through the hills that another bear has been killed, often under the most adventurous circumstances.

The number of bears shot in the Alps may be guessed at from twelve to twenty head a year in modern times. There are, it may be said, bear-years, in which an extraordinary number of these beasts appear, and many are shot within narrow limits; and other years again in which but few are heard of. The number of bears killed would be far greater if there were more hunters in the mountains, and the reward paid were greater. (In the Grisons the government pays only twenty-eight francs a bear, old or young, besides which the sportsman gets the beast and skins.) Enumerations by foresters and huntsmen estimate the bear population, from the Graian Alps, to Styria and Krain, at some 500 head. The calculation, however, becomes more uncertain, as it appears that the bear is continually wandering between the east and west of Europe, and only keeps to his quarters for an uncertain period.

Münchhausen is not only a colleague of the hunter of the hills and plains, he has also found reception amongst the Alpine hunters; hence it follows that a number of the most exaggerated bear-hunting stories are to be heard. This does not however exclude the fact that there are hunting adventures which are of the most exciting character.

A tragi-comic action with bears took place in the summer 1857, at the bottom of the Engadine Valley, Val d'Uina. A hungry fellow had several times attacked herds which pastured on the slopes of the Griankopf and Piz Cornet, so that a hunt was got up against him. A man of Sins met the rough companion in the wilderness, shot at him, and singed his coat with a bullet. The bear, too slightly wounded to be incapable of escape, turned angrily at the hunter, who, perceiving the danger of his position, took refuge behind a large rock in the open.

Whilst the bear followed him growling and limping along, the hunter loaded again, running steadily round the rock. When his rifle was ready, he halted again, fired and hit the beast, but still without killing it. The bear only grew the angrier, and rushing round the rock, first left and then right, a hide-and-seek game began between the bleeding bear and the flying huntsman, that became more terrible every moment. Far and wide nothing but a barren wilderness — no friend to save him or to support him against the bear. The peasant of Sins never lost his presence of mind, and a certain rare coolness. He succeeded during the chase in loading his rifle again, and fired a third time. Whether he hit this time is uncertain. To his horror the hunter now discovered that his ammunition was at an end; he had probably lost part of it by loading during his course. The game began to get terrible. The bear's loss of blood was indeed becoming greater, but its fury increased at the same time. The mountaineer, almost senseless, still continued his flight round the rock, and hoped to weary the beast, so that his strength would fail, but in vain. He saw himself constantly pursued step by step by the monster with loud growls, now close behind him, and now meeting him by a circuit. His knees trembled, his feet became unsteady and stumbled more than once, he lost his breath, and bathed in sweat he expected every moment to fall down fainting. At length the beast grew tired, his growls came only in bursts, and his run was interrupted. The hunter, wearied to death, took advantage of this circumstance, and rushed with a last exertion of all his strength to the valley, without for a long time looking round to see whether he was followed or not. He escaped, but could hardly get to his house. He was thrown on to a bed of sickness from severe exhaustion.

Neighbours who went up to the place well armed next morning, followed up the traces of blood, and found the beast lying dead at a considerable distance from the theatre of the chase.

Colani of Pontresina, in the Ober Engadine, once displayed no less presence of mind and determination. He one day discovered, during a hunt, the unmistakable tracks of a bear, and, following it along a ledge of rock (similar to that shown in our picture of the chamois-hunting adventure), came to a cave, in front of which the path ran. As the day was already late, and he had only a light rifle with him, he determined to put off his attack upon the beast, and returned with the greatest care.

Next day, before dawn, the right hunting time, he went accompanied by his son, then twelve years old, to the bear's cave; the lad had also a rifle with him. They had not lain long before the lair, the boy close behind him, when something living began to stir inside. Soon two eyes like coals shone from the depths of the cave, and the old experienced sportsman fired his first shot at them. He had hit, for a loud roaring growl came up from the cave; but at the same time the dark outlines became more distinct, and next moment a huge she-bear crept out of the cave. When Colani thought he was certain of his aim, he fired again. He shattered the right forepaw of the monster, which fell with a thundering growl, but instantly got up, crept out of the cave, and prepared for action on its two hind legs, as the forelegs were unserviceable. "Father, shall I shoot?" cried the lad, who was looking over his father's shoulder trembling for eagerness. But old Colani did not for a moment lose his coolness as a huntsman, and his calm decision. The next shot must make an end of the beast, or it would be all up with his boy and him. "Give me the rifle," he told

his boy, without turning his eyes from his prey, and changed arms whilst the bear was only a few paces from him. He coolly allowed the brute, standing upright, to come so near him, that the muzzle of the gun almost entered its wide mouth. The first barrel missed fire, the second rang, and the beast fell over with a heavy fall, a bullet through its brains. The boy could stand it no more; in a twinkling he clambered round his father on the steep slope, and hammered with the butt of his rifle on the skull of the struggling beast till the last spark of life was extinct. Colani has been dead for many years, but his son is now a courageous chamois hunter, and, in summer, guide to the top of Piz Languard.

The latest and oddest adventure with bears took place at midday on the 18th of August 1860, on the Buffalora Pass. A Bergamesque shepherd, some of whose sheep had been killed, had taken off their skins, cut away the flesh that was not spoilt, and packed them on his horse, to bring it to his hut. Without the least thought of danger, he was riding along the road, sitting sideways in Bergamesque fashion, when he suddenly met two young bears, one of whom, astonished at the unwonted spectacle, began to roar loudly. The old she-bear, suspecting that something was happening to her young, dashed out of the forest and furiously attacked horse and rider. The shepherd jumped off, to save himself, leaving his horse to its fate. The horse, more courageous than its master, kicked out so vigorously with his hinder hoofs, that the bear, deafened by the hail of boxes on the ear, shrank back several times, but always recovered herself and repeated her attacks. The rough brown woollen cloak of the shepherd, in which the skins and meat were wrapped up, was loosened by the violent plunges of the horse, and fell as a fresh onslaught on to the head of the bear already blinded with fury. The bear,

supposing herself attacked by a new enemy, left the horse in peace, and with her young ones set about pulling the cloak into millions of rags, whilst the shepherd with his horse took hastily to flight, and luckily reached the public-house, where he was taken seriously ill.

The summer of 1860 was remarkable for the number of bears; in the Lower Engadine they frequently came close to the villages, and it happened at Süss that a huge overgrown "Master Petz" was feeding carelessly about half a rifle-shot from the high road, whilst a driver was cracking his whip with all his might to drive him away, and across the Inn half a dozen people were busy hay-making. At Zernetz, a few days before, a bear had carried off seventeen of the fattest sheep in ten days.

It does not however always pass off so well. On the news of the great number of bears in 1860, a couple of gentlemen, the Prussian Prime Minister, the Prince of Siegmaringen, who was staying at his summer seat of Weinburg, and the Grand Duke of Hesse, in company with some well-known Alpine hunters, attempted a bear hunt in the Engadine towards the end of September, but could find no beasts, and had to content themselves with shooting a few chamois.

The bear is at first shy, almost cowardly; he flies with his prey, when he has robbed a herd, as if an evil conscience drove him from the presence of men. Only when he is provoked or attacked, or when he supposes that his young ones are threatened, does he take the offensive. The vulture and eagle are more vicious than Bruin amongst the Alpine animals of prey. They do not wait to be attacked, but attack of themselves, though with very acute calculation, when they think they can be sure of their prey. Chamois hunters, root-diggers, wild-hay cutters, can tell stories enough of cases when they have been surprised on

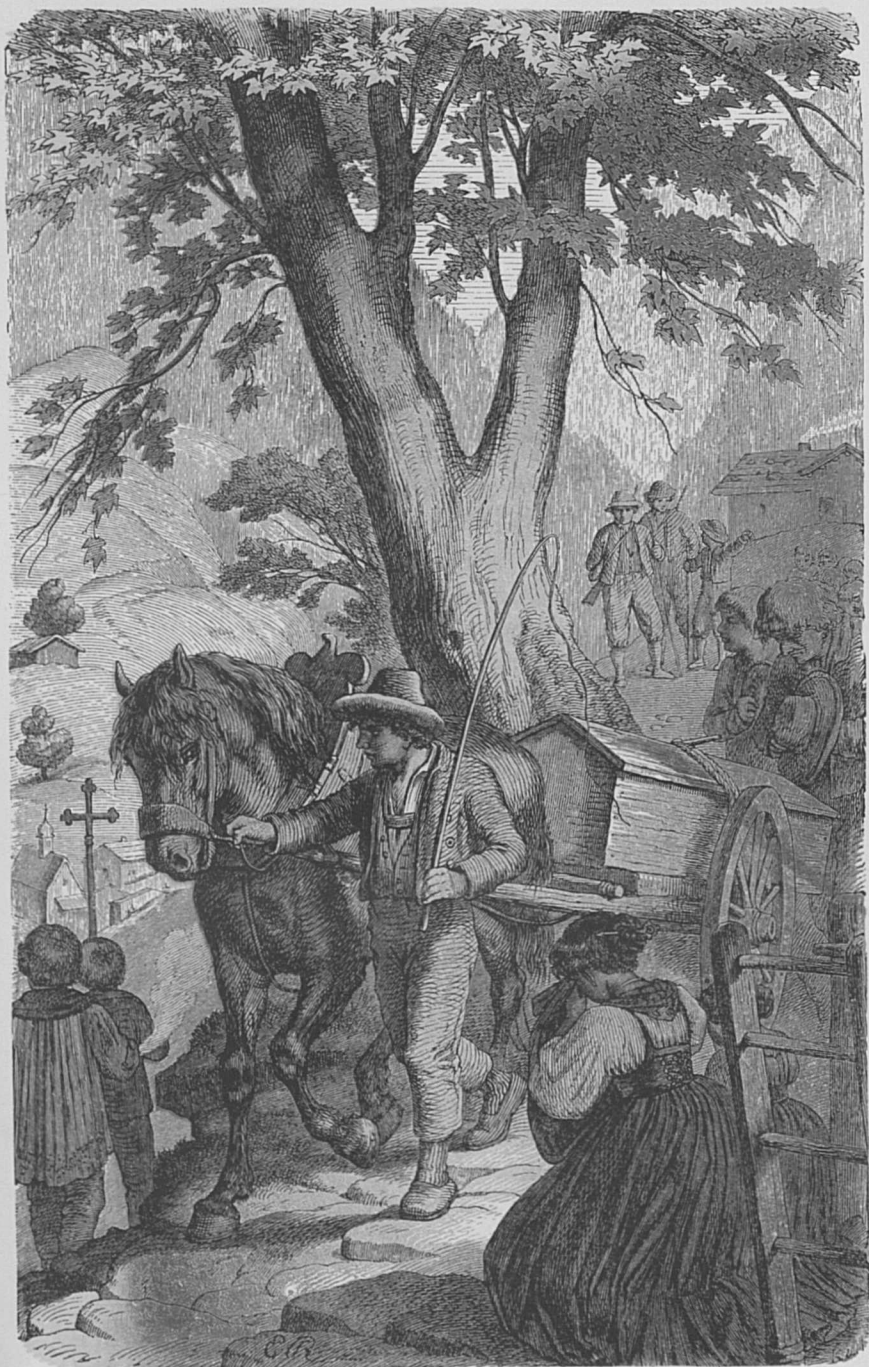
steep cliffs by a huge bird of prey, and which has tried to hurl them into the abyss by a stroke of its wings. Christian Danuser of Felsberg, forest-inspector in the Val Misocco, was standing one morning in the middle of September, 1856, close by the edge of a lofty rocky cliff, and looking out for chamois below. Startled by a loud and increasing rustling in the air, he saw a large eagle (steinadler), at a height of some sixty feet above him, on the point of swooping down upon him with closed wings. Danuser, who well knew the treacherous mode of attack of this animal, jumped hastily a few paces backwards, threw himself on the ground, and was hardly on his back when the eagle shot by, and passed so close as to touch him with the extreme point of one wing. The bird had scarcely shot past its intended victim at its full speed into the depth, when he jumped up, fired at the eagle with his rifle as it slowly raised itself again, and knocked it over just as it was preparing to make a second attack. The bullet of the determined hunter had pierced the bird's breast, and with a mighty clap (as Danuser expressed himself) it fell dead before him. This beautiful specimen is now stuffed and adorns a collection at Frankfort-on-the-Maine.

CHAP. XXXIV.

VILLAGE LIFE IN THE MOUNTAINS.

It is pretty much the same with village life in the mountains as with the imaginary poetry of "Senn" life on the Alps; people are apt to suppose it to be in many respects far more romantic than it really is. The enthusiastic visitor from the plains, who has at his command all the conveniences of travel, only carries away the pleasant general impression of the summer morning landscape blue with vapour, and the peaceful evenings spent in the Alpine valleys, and transfers this satisfaction of all his wants to the village in which he lived, to its inhabitants and their circumstances in business and society, without becoming really acquainted with them in their internal relations and habits; he constructs for himself, whilst using the first name at hand, an ideal Alpine village, from the fancies which move round him in happy hours, and thus creates a thing which has no existence in reality.

The Alpine peasant, as we have already learnt to know him in detached sketches, is, on both sides of the mountains, a very rough and intensely prosaic character, who would at first sight be hardly distinguished (except perhaps in dress and bearing) from the peasant of the plain, if it were not that a far more substantial nature, and a kind of primeval originality, one might almost say a classical simplicity, were concealed behind his modesty and



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prosaic appearance. He is far from being so drilled and polished as most agricultural peasants, who, by continual intercourse with town life, have learnt and received much from it. This is the peculiarity which appears in every mountaineer as compared with the lowlander. Their patriarchal solemnity is increased by the more vigorous and direct expression, which again is a result of the action of an imposing and often terribly sublime nature. It gives steel and vigour not only to the body, but also to the character of the people, which is unacquainted with the daily accumulating new wants of the great world, and therefore moderate in its desires, and grown rigid with old-fashioned forms and usages, which are striking and pleasing on account of their very strangeness and old-fashion.

We next meet these inartificial natural forms of life, and most immediately, in the arrangement of the houses, which is strange to us. They are an integral part of the charming landscape, and enliven it remarkably by their scattered positions among the meadows. They would however not be sufficient to produce their picturesque poetical effect, if we were only to recognise in them over again the well-known straight lines, the external marks of modern architecture in the plains, and the modest white stripes of colour. Dwellings in the Alpine villages are not like artistic erections of the human hand: they seem to have grown out of the ground with the trees and mountains. There is still the sappy, faint brown colour of the wood, which Nature herself has given to the stems; there are the silver-glancing shingle roofs, loaded with the heavily mossed stones, the sturdy guardians against the wild Föhn wind. Broad and low stands the mountain house, as if it had been half sunk into the ground by the yearlong pressure of the stones; but just this comfortable,

crouching breadth gives it an infinitely pleasant rest, which corresponds to the sublime simplicity and quiet of the Alpine world. Advantageously as these houses act upon the composition of the landscape, their internal arrangement and constitution would be little satisfactory to visitors. The carelessness for cleanliness in their dwellings, more or less characteristic of all pastoral people, prevents any idyllic illusion. The household stuff is simple beyond all conception ; a great part of it is the produce of the domestic handiwork, and there is many a village in the Alpine recesses in which the iron door-lock has as yet found no reception or application, and the burning pine torch supplies the place of sunlight or oil lamps. No chimney provides for the smoke from hearth or stove to give it exit ; in many mountain houses the shaft of the chimney goes down to the ground floor, and there smokes through every hole and crevice of the roof. Men and cattle live and thrive in common in the same house ; the stables generally take up a considerable part of it, and protect it in winter against severe cold by their natural warmth.

On entering the little church of the Alpine village, it seems as if one had taken a gigantic step back into the middle ages. Most of them are models of simplicity in architecture, and scarcely betray the time of their foundation or the style to which they belong. The interior has the same quiet simplicity, adorned with all kinds of ornaments from the hands of strolling painters, pictures from the life of the patron saint of the place, or other legends of saints, in which the devil with horns and hoofs generally plays a conspicuous part ; it frequently happens that the village youth have given way to their wrath against this hellish monster, and quite scratched out Satan in holy zeal. Or one suddenly finds, to one's utter as-

tonishment, a new altar-piece painted by an able hand, and hears on further inquiry that some Düsseldorf or Munich painter, after lodging all the summer in the village inn, painted this picture and gave it to the church. There are also Alpine villages, in the deep valley recesses, which have places of worship of noble style and elaborate execution, with marble columns and excellent carvings — churches which far surpass those of many a capital. A monastery either stands or has stood there, which built the church from its well-filled budget, or by the help of the obedient people of the valley; or a man has lived in this secluded corner of the Alps, who knew how to excite his neighbours to such a great work, so that all lent a hand till the building was completely finished. The mastery of outward circumstances which is everywhere apparent in the Alps, shows itself here also.

And now the life itself of these villages in these great hermitages of central Europe — how much primeval simplicity meets us here too! Most inhabitants of the Alps enter their family circle without the assistance of the midwife or medical aid. The first nursing which they receive is often far inferior to that with which the wild she-bear instinctively cares for and protects her young. There are no few districts amongst the Alps whose inhabitants look upon the blessing of children as a great material burden, for is it poverty alone which chases out the wandering youth of Savoy into the strange distant world, or is it not far more the almost dried-up spirit, the parents' hearts turned to rock and stone, that always renews this spectacle which has become a popular custom? On this ground too the performance of baptism in many parts of the Alps is not a family feast. And again, the most striking contrast lies close beside it. Wherever the people, either from zealous faith and conviction, or from

the pressure of necessity, place a high value on baptism, long pilgrimages to the church of the commune often take place with the child a few days old; for house baptism is not known in the Alps, and it is not every village or every hamlet or house in a remote side valley that possesses its own church. The evangelical Valaisans went, for centuries after the Reformation, when the Catholic faith had been revived all round them, a good six or seven hours over ice and snow with the children to be baptized to the Protestant Grindelwald, to receive from the priest of their faith the sanction of the church for the admission of their children to the Christian community. Their path was one which the boldest mountaineer of the present day scarcely ventures to take, because it is all covered with fearful glaciers and torn by crevasses. Here again the strength and obstinacy of the mountaineer shows itself, the earnestness and endurance, the firm will and courage, not only in matters of every-day necessity, but in matters of his own decision and free will: tough as he is in physical hardships, he is equally enduring in the results of his reflection and free will.

Given over almost entirely to physical development, the child grows up half naked with the domestic animals. During the better season its playground is on the swelling meadow that surrounds the "heimet" (homestead), in the forest, or on the steep rocky cliff, always surrounded by a thousand dangers, here of tumbling into the brook or being crushed by falling stones, there of being drowned in the lake or poisoned by plants and berries; but as it is not peace but war which makes great heroes, all these horrors threatening his tender youth make the child of the Alps ready and strong for his lot in life. A manly, Spartan, and iron race of people would grow up in every direction were it not that an utter want of attention to

external cleanliness, and a life passed during the winter in overheated and narrow rooms full of foul air, prevent a healthy normal development of the body. Hence, in particular districts, where other agents are at work in the same direction, there is a remarkable number of cretins, idiots, and half-developed human beings. The school troubles the small citizen of the Alps little enough; three or four elementary branches within the narrowest limits are sufficient to lay a basis for the spiritual horizon of all their life; the practice of later years must teach everything else. And this schoolltime—oh worthy example, thought of happiness for youth oppressed by instruction and lessons!—lasts only six months; the whole beautiful long summer, from Easter to Michaelmas, is holiday—holidays for teacher and scholars. What is thirstily imbibed by the nerves of the brain during winter, and learnt by rote on the finger during winter, is puffed away again during the free summer life on the hills and the fragrant grass slopes; only a few remains of arithmetic for home and market use, a little capacity for reading, and the often scarcely decipherable hieroglyphs which represent a signature, are in many cases all that the scholars have accumulated for futurity. And under what difficult circumstances are these trifling gains acquired! The teacher, poor man, is generally on the same level with the shepherds in point of pay, frequently even below them; he is a wandering scholar, who has to scrape together a provision for the summer time, who, if he possesses a cottage and a little land, with a few head of cattle, fills up the time left from instruction with land and hand work. In more than a hundred villages there is no school-house; a little room in the parson's dwelling, or at the chaplain's, where scarcely half the children can find sitting room, has to supply its place. The schoolmaster has

a sleeping-room in the same house, or wherever there is room for him, and has his meals to-day here, to-morrow there, at the peasants' tables. The children often come an hour's distance in snow and stormy weather to the school.

When the boy begins life, his future, as elsewhere, depends on his parents' possessions, on the number of his brothers and sisters, and a hundred other circumstances. Many a poor lad, who formerly kept his goats, and called little besides his clothes his property, has acquired wealth and estates. The people of Grisons are above all others a strangely speculative race. This great, thinly populated country sends every year a considerable part of its population abroad, in order to earn their bread. What is least of all peculiar to them at home, sugar and sweet-meats, lays the foundation of no small prosperity with many of them. They travel as poor boys, fitted out with a few pence and a travelling recommendation, far away into Italy, Germany, Russia, and France, in order to act as servants and helpers to some confectioner established there. Here they learn to grind cocoa, pound sugar, and boil coffee, and thus by degrees learn to become confectioners. They save up with the utmost care their few pence of pay and "trinkgeld." Meanwhile they find opportunity to hire a little room from some other countryman, even to establish a chestnut business, a little chocolate manufactory, or a coffee-shop. The groschen grow into dollars, the companions separate, each of them to set up in business on his own account; they set up greater businesses, and full manhood finds them rich people. Then their longing drives them back to their dear old fatherland, where by degrees they acquire estates, meadows, houses, and there, in quiet solitude, they wear away the evenings of their lives. Another part of

the young fellows, especially from the Catholic cantons of the Valais, Uri, Unterwalden, Schwyz, and the Grisons, leave house and home to seek their fortune as mercenary soldiers abroad. The Swiss troops in Rome and Naples have lately had a melancholy celebrity. Or the Tyrolese becomes an imperial "Jäger" in the Austrian garrisons, ripens into a steady man, has capitulated and served his fatherland, when death calls him home on a battle-field, or a miserable pension supports him needily in his old age. Most Alpine lads, however, who possess but few means, stay in their mountains, and do not stir a hair's-breadth in their way of life from the household usages of their remote ancestors. According to their capacities and local usages, they either devote themselves to cattle breeding, learn to understand markets and trade, and try their luck themselves; or they become "floaters," woodcutters, root-diggers, and perhaps guides in summer. There are but a few places in which, as in the Bernese Oberland, a real manufacturing trade and industrial activity have found space.

The mountaineer depends far less on foreign help and foreign productions in his way of life than the lowland peasant; meat, milk, cheese, and butter are provided by his own stable, he gets his rough black bread from the corn he has himself gathered in, and he weaves his clothes himself. There are families in the mountain villages which do not for months take in hand the smallest bit of money for their support. In many Alpine valleys there are no inns, and where they exist they are houses rather for social meetings than for running up scores. Thus, for example, the peasants of the Livinertal, watered by the Spoel, sit for hours together in their inn smoking their "Regie-tabak" (the only tobacco used in the Austrian time) without consuming a drop of wine or

brandy ; there, however, they scream and dispute as lustily and with as much feverish excitement over their game of *mora*, as if they were soaked through and through. Such friendly visits to inns, in which there is no intention of consuming anything, occur also in the German-speaking population of Alpine villages, although they are more frequent on the Italian side. It is a habit of the ancient celebrated hospitality of all mountain folk ; their solitude and need of human society brings them together, without boozing and gorging often demanding their tribute. In those valleys in which no inns exist, it is often the man of spiritual consolations, the parson or chaplain, who also takes charge of the hungry and thirsty needs of travellers ; in the Valais, in Canton Unterwalden, and in other districts, the wine-bottle and slice of cheese are an accidental trade of the spiritual class.

There is a great number of Alpine villages upon which the extreme of solitude and still life has settled ; few are surpassed by Rofner Hoff, on the Oetzthaler Ferner in the Tyrol, where once Frederick of the empty purse found an asylum after being proscribed by the Council of Constance. Four brothers live there together, and work at all the trades in common which have to be carried on for their wants in life ; they are shut out from all intercourse, like a colony of Robinson Crusoes, and winter, at this height of over 6000 feet above the sea, divides them for near half a year from their next neighbours.

In this separation from the noisy enjoyments of the outward world, there are still places in the Alps where, from the popular temperament and manners, they have merry times enough. The country feasts in summer, the journey to the Alp, the "Goh-messe" day, the wrestling and Alp feasts, have already been sufficiently

treated of; but the mountain population is not content with them. When the herds come home well-fed and fat from the lofty pastures, old and young celebrate the return of their domestic companions; that is the "Aelpler kilbi," which falls with the village feast at many places. Then the country customs are seen. In many Valaisan valleys they bring the parson's tithes to his house, consisting of great fat cheeses; his reverence then regales his parishioners with a substantial, well-prepared mid-day's meal, in which there is no want of wine. In Unterwalden the whole troop of "Sennen," exuberantly adorned with wreaths of flowers, goes one Sunday in autumn to church, and takes the place of honour of the day on the front benches. After the picture of their patron saint, Wendelinus, has been placed on the altar, the priest of the place preaches a sermon in praise of the herdsman's position, and the rest of the divine service is carried out according to the ritual. When church is at an end, an exulting meeting takes place out of doors. The musicians swell their flourishes, the Alpine flag waves, and St. Wendelinus is carried through the village in a lively procession accompanied by the priest; lads dressed up as savage men and women, wrapped up in green pine-twigs, with beards of long lichens (*Usnea barbata*), heighten the general madness, whilst the flag is brandished in artistically studied motions. So the procession goes to the inn, where the excitement rises to the highest, and is concluded with a pleasing act of humanity in the meadow, where the "braten-meister" (master of the roast) gives to the poorest people of the village the "kirchweih-braten," adorned with flowers, and a great can of wine of the best. Next morning, when all have slept, the dance begins after the usual divine service, and is continued with noise and excitement as

long as a leg can shake. The Appenzell people behave still more madly in their "kilbene" at Urnäsch: there day and night passes in feast and fun. And what is held the greatest honour for the maiden who comes from the feast?—will it be believed? Black-and-blue and bloody elbows!—it is a sign that she has had brave partners, and never been left out of a dance. The room in which they dance is in fact so small for the crowd, that in the vigorous whirling the bare elbows are constantly knocking together, and hence the bloody signs of victory. In the Vorder-rheinthal in the Grisons, such a feast comes off at the carnival time, which lasts three days and three nights; the guests bring their food with them, and merely take wine from the host. The love of dancing (which generally takes place only a few days in the year) is generally so strong in the Alpine people that the strangest results follow. Thus it is customary in the Appenzell country that after the so-called "Trägete," *i. e.* after the hay has been brought down from the outlying mountains into the deeper valleys, the owners give a dance to the lads who have taken part in the work, on a barn floor, with a very frugal meal to reward them. There they all press together to be allowed a share in the work, in order to be able to have a few hours' dancing.

The winter evenings, too, are by no means so quiet as one might fancy from the scattered position of the houses. The women have their spinning parties, in which all kinds of wondrous stories and superstitious hocus-pocus are related; and when they have heated their fancies to the utmost, at least in the Catholic valleys, they finish by repeating a common prayer, some half-hour long, to protect and shelter themselves against the attacks of the powers of evil. In the Mayenthal on the St. Gothard, which is frequently threatened by avalanches, the neigh-

bours collect in stormy winter weather in one of the largest houses, in order to watch and be able to set to work together, if a snowfall should come down and bury everything. In order, however, that time may not pass too slowly for the good people, they dance through the dangerous night to the sound of a fiddle or accordions. Thus custom dulls a fear which the foreigner cannot think of without horror.

The winter's evening meetings, the "Spinneten," "Stubeten," or "z'Liecht goh," in which young people of both sexes take part, generally introduce the love affairs of the village, whose immediate consequence is the "Kiltgang." This custom does not prevail everywhere, and where it does its effect upon morals is very various. "Kiltgang" means the leave which any maiden (with the knowledge of her parents) grants to her lover to visit her in the evening at home. Sometimes this *tête-à-tête* only takes place at the window, so that the lad has to scramble up on to a heap of split wood, and talk confidentially with the maiden of his choice far into the night, for which reason the inhabitants of the Bavarian and Salzburg Alps call it "s'Fensterln;" or the meeting takes place in the girl's room, and lasts till the grey of morning. In both cases the girl regales her lover with cakes and wine or other spirituous liquors. It is an ancient custom, which has caused evils enough, but which it is hard to banish. As the lads of a place, *i. e.* all the marriageable young fellows, will not suffer any one to come into their village from another, especially not to the daughters of a rich peasant, the "Kiltgang" has often caused murder and homicide, and unfortunately criminal trials take place almost every year resulting from this old popular custom. The favoured lover must win his bride with cunning and courage, with undaunted and bold bearing, if he does not belong to the lads or "nacht-

buben" (nightboys) of the place. The mountaineer is rough and ready in all that he does and undertakes.

The marriage feast-day has retained but little poetical beauty in most Alpine villages; generally this most delightful moment of life has sunk into a modest exhibition restrained by need and social laws, which is carried on materially with eating, drinking, and dancing, without any symbolical ceremony. The pleasantest usages, with great local variations, still prevail in the Bavarian highlands, in the Salzkammergut, and in part of the Tyrol, where the handsome popular costume adds considerably to the ornament of the solemnity. In many villages there, the bride is slyly hidden on the evening before the marriage, and the bridegroom, with the help of his friends, has to observe all the movements of the bride's party like a hostile general, and continually to reconnoitre the neighbourhood of the house, in order to force his way into the place of concealment and carry off his bride like a conqueror. If he is a clear-headed sharp fellow he does not attack till he is sure of his victory; roars of laughter and good-humoured chaff follow him for a long time if he makes one or two misses. He who makes a right shot at first, is expected to make a good sensible master of the house, who gets everything by the right way, and goes with open eyes at his mark.

Similar preliminaries occur in the Livinertal. There the bridegroom, accompanied by his friends and relations, goes to the house of the bride and demands that she should be given up. A long parley follows, in which the drollest and most pointed remarks are made. At last the father decides to open the house-door and bring out the lady of his heart to the bridegroom; but generally the oldest housewife of the neighbourhood, with a long hood or cloak over her back, or a dressed-up puppet of straw

or some other object, is pushed out to the bridegroom, at which the whole crowd explodes in storms of laughter. The seeker, tired of the jokes, at last forces his way tumultuously into the house, and finds the bride in her ornaments, whom he carries off in triumph.

It is only in a few valleys that the pretty custom prevails of going to church with a long festive train of bridesmaids with wreaths, and playing musicians in front. The way in which the bride is brought home from the Immensee in Schiller's "William Tell," is long gone out of use. Dulness has penetrated into the mountains, and has destroyed many beautiful customs with the disuse of the old national dress. The firing off of old rusty blunderbusses, pistols, and muskets, on the way to church, or even of hollowed pipes of wood buried in the earth, is still pretty commonly practised, and, owing to carelessness, produces many hours of terror in the thunders of joy.

Sunday in mountain villages has something very elevating and solemn. It is as if all nature kept holiday. The same wondrous acoustic walls, which give back the tone of the Alp horn with such magic modulations, repeat also the sound of bells in the Alpine valleys with indescribable beauty. The sound seems to lose its metallic tone, and takes a deeper, warmer fulness, such as is peculiar to crystal bells of glass. To hear the church-bells ring from a rather lofty point above an Alpine tarn on a clear summer morning, as the calling and answering bells send their notes far and wide over valley and gorge, and the whole landscape round listens in blissful peace to the tones, belongs to the best enjoyments which the mountain world can give to the receiving spirit. The congregations in their country Sunday dress stream up out of every corner, from the dark ravines, and down from the brown timber chalets over the spring-green

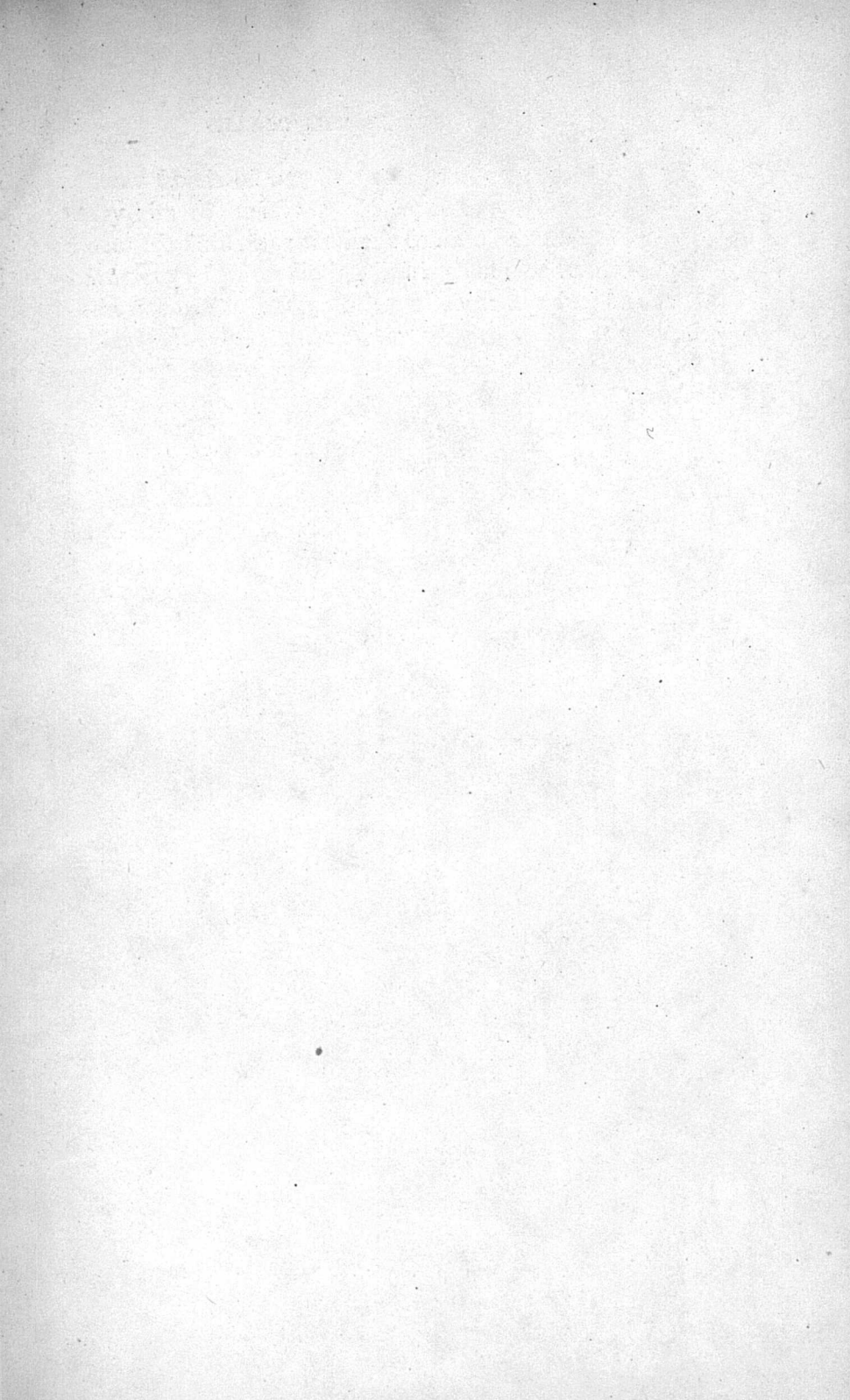
meadows. The women and girls, according to the valley custom, solemn and dark in their thickly folded gowns, or in bright lively colours with picturesque caps boldly perched on their heads, and silver chains, go straight into the church, whilst the men and boys stand without and talk over events, till the whole peal sounds together as a last warning, and now the organ raises its mighty voice, and everything is still and quiet in the lanes. Such is Sunday—it is a real feast, more impressive than in towns; and when church is over, those who have lately lost a dear member of their family wander to the graves and adorn them with freshly plucked Alpine roses, or deck the simple black cross with a wreath of immortels, rosemary, and cloves. The men go into the inn to strengthen themselves for their long walk home, or there is a general meeting before the church, where government proclamations and orders about military service are read, or parish officers chosen. Afternoon unites the young men in the shooting-ground; for the rifle is the mountaineer's dearest arm, with which he defends the freedom of his hills and his fatherland, if any foreign intruders should wish to undertake victorious expeditions to it.

And when the small, quiet life of Alpine solitude has passed, when the body is given back to the earth whence it came, a new peculiar impression is made upon us by this last solemnity. Down in the country where all the neighbours live close together, and have grouped their houses round the village church, there (if we do not attend to special country customs) burial is almost everywhere alike. It is different in the Alps, when, an hour from the common resting-place, the citizen of this world enters eternity. The way which he went every Sunday to church whilst alive, his corpse has now to go in its

narrow house of boards for the last time. It is hard to carry him so far down. Then, if it is summer, the son places his father's or mother's coffin on a small narrow car, harnesses whatever he has in his stable—a horse or a cow—in front of it, and so bears the earthly remains to the valley. Wherever the mournful procession comes, the people run out, pray aloud “Our Father,” or join the procession. And if winter has cast its mantle of snow over mountain and valley, the sleigh has to do its last service to the dead. The coffin is firmly tied on; a strong, powerful man, with two alpenstocks under his arms, places himself in front, guides it with his feet, and shoots down with the corpse in rapid flight to the valley.

THE END.

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